Interim Report

February 28, 2007

Availability and Disparity Study

California Department of Transportation

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Prepared for

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SECTION ES.
Executive Summary

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Executive Summary

The California Department of Transportation (Caltrans) must implement the Federal Disadvantaged Business Enterprise (DBE) Program in order to receive U.S. Department of Transportation (USDOT) funds. Recent legal decisions and guidance from USDOT have led Caltrans to reexamine how it implements the Program. Caltrans retained BBC Research & Consulting (BBC) to conduct an Availability and Disparity Study to assist Caltrans in its implementation of the Federal DBE Program.

The Interim Report provides preliminary analysis related to relative availability of DBEs to perform transportation construction and engineering contracts. The Final Report, scheduled for June 2007, will address issues in Figure ES-1.

Information in the Interim Report

The Interim Report contains preliminary information produced from the following research:

1. BBC developed a database of firms available to perform specific types of transportation construction and engineering work in different parts of the state. BBC started with a list of California business establishments identified by Dun & Bradstreet. The BBC study team interviewed 18,675 firms concerning their qualifications and interest in Caltrans and local government projects.

2. BBC developed a database of more than 10,000 prime contracts and subcontracts for Caltrans and local agency projects from 2002 through 2006.

3. BBC is examining whether there are barriers to entry and other factors that may have impacted opportunities for minorities and women to form construction and engineering businesses in California.

Figure ES-1.
Factors for Caltrans to consider when implementing the Federal DBE Program

1. What is the overall DBE goal? BBC is providing Caltrans information to consider as it sets an annual goal for DBE participation in federally-funded contracts, including contracts awarded by local agencies that receive federal funds through Caltrans.

2. How much of the overall DBE goal can be achieved through neutral measures? Disparity Study information can be used by Caltrans as it considers whether it will continue to utilize only race- and gender-neutral measures or whether some race- and gender-based measures (such as DBE contract goals) are also needed.

3. What specific measures are needed to implement the Federal DBE Program? BBC will identify measures for Caltrans to consider in implementation of the program.

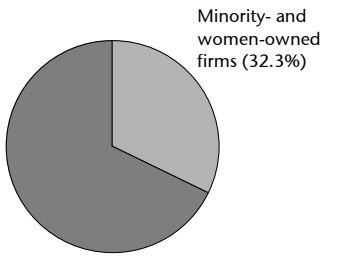
Among firms surveyed by BBC for the availability analysis, 3,398 indicated that they perform work related to transportation construction and engineering, were qualified and interested in future work with Caltrans or local governments, and had made past attempts to obtain this work. In BBC's analysis, this subset of firms is "available" for specific types and locations of future prime contracts and subcontracts. About 32 percent of these firms reported that they were minority- or women-owned (see Figure ES-2). In BBC's analysis, 230, or 6.8 percent, of these 3,398 firms were DBE certified as of 2006. Fewer than one-in-four minority- and women-owned firms available for transportation construction and engineering work are DBE certified.

As BBC continues the Availability and Disparity Study, it will consider various factors that may have impacted the relative number of minority- and women-owned firms currently available for work related to transportation construction and engineering. Some of the preliminary information concerning potential barriers to entry into the construction and engineering industries is summarized in Figure ES-3. BBC will review these and other factors in the Final Report. The Final Report will also include analysis of why many minority- and women-owned firms are not currently certified as DBEs. The Final Report findings will assist Caltrans in establishing an overall DBE goal.

Initial Recommendations

BBC recommends Caltrans change how it collects and maintains data on firms seeking and receiving work on Caltrans and local agency projects. Improvements include a new bidders list and better information on firms receiving subcontracts.

Figure ES-2.
MBE/WBEs as a share of firms available for future transportation contracting work



Note: Unweighted. Preliminary results, subject to refinement.
Source: BBC Research and Consulting from 2006 Availability Survey.

Figure ES-3.
Preliminary information concerning barriers to entry into the construction and engineering industries

Low number of African Americans and Hispanic Americans attending college and enrolled in engineering programs.

Low representation of African Americans and women in the construction industry.

Limited advancement of Hispanic Americans to certain construction trades and first-line supervisor positions.

Low number of African Americans, Hispanic Americans and women working as managers in the construction industry.

Low rates of business ownership for African Americans, Hispanic Americans, Subcontinent Asian Americans and women working in construction.

Low rates of business ownership for African Americans, Asian-Pacific Americans, Hispanic Americans and women working in the engineering industry.

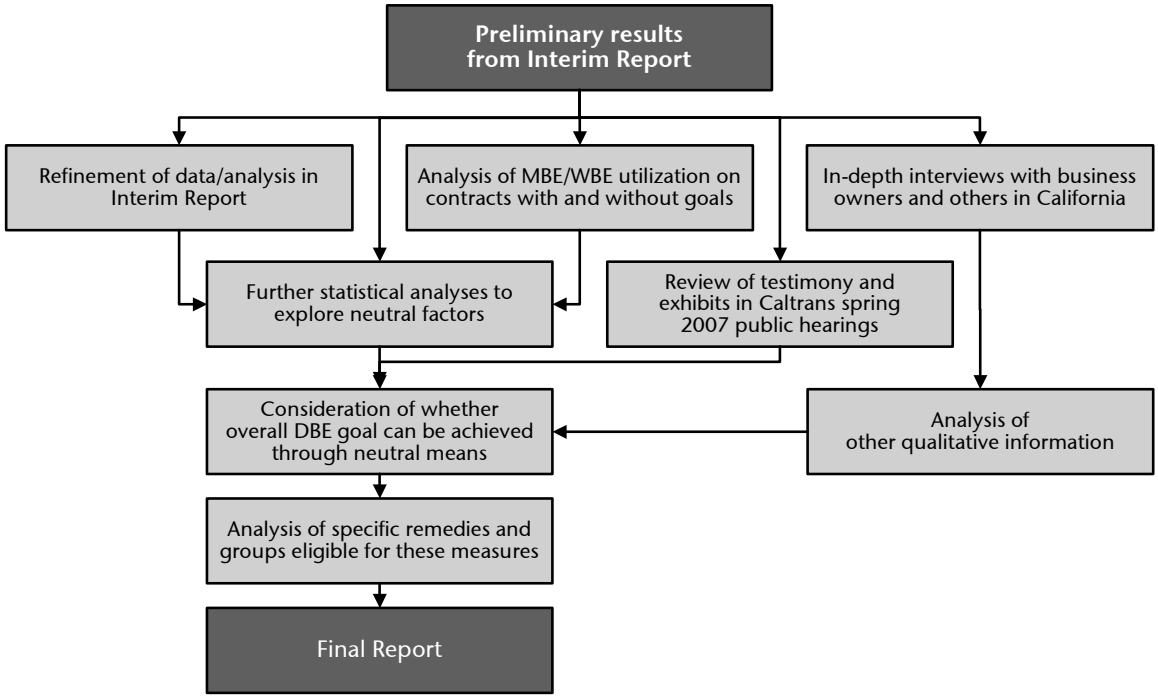
Low homeownership rates and high mortgage loan denial rates for African Americans, Hispanic Americans and Native Americans. (Home equity is an important source of capital for business.)

High denial rates for business loans for African Americans, Asian Americans and Hispanic Americans.

Additional Questions to be Analyzed in the Final Report

Figure ES-4 illustrates the process for completing the Final Report. BBC will analyze whether there are disparities between actual utilization of minority- and women-owned firms and what would be expected based on relative availability to perform this work. The study team will also review qualitative information gathered from in-depth interviews with business owners and testimony given at Caltrans' public hearings planned for spring 2007. BBC will then provide pertinent information to assist Caltrans in determining future implementation of the federal DBE Program.

Figure ES-4.
Additional analyses to prepare the Final Report



SECTION I.
Introduction

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Introduction

This Interim Report provides initial information from the Availability and Disparity Study conducted for the California Department of Transportation (Caltrans). The study team will be collecting and analyzing additional qualitative and quantitative information before preparing conclusions and recommendations in the Final Report at the end of June 2007. All results presented in the Interim Report are preliminary and subject to refinement in the Final Report.

Results of this analysis provide information to assist Caltrans in determining how it will implement the Federal Disadvantaged Business Enterprise (DBE) Program in the future.

The balance of this section explains:

- Scope of the study;
- The Federal DBE Program;
- Legal requirements for Caltrans implementation of the Program;
- Summary of Interim Report elements; and
- BBC's next steps.

Study Scope

This Availability and Disparity Study examines the transportation construction and engineering industry in California and related contracts awarded by Caltrans or with funds administered by Caltrans. More than 600 municipalities, counties and regional agencies receive federal and state transportation funding through the Caltrans Local Assistance Program. Larger public transportation agencies such as the Bay Area Rapid Transit Authority (BART) receive funds directly from the federal government and therefore are not examined in this study.

The Study includes FHWA-, FTA- and state-funded contracts. Caltrans did not include FAA-assisted contracts in this study. The study team examined contracts in each Caltrans district. (Figure I-1 on the following page identifies Caltrans districts and regions.) Analysis includes firms receiving prime contracts and subcontracts as well as suppliers and truckers. Appendix A (Definition of Terms) explains key terms used in the Interim Report.

Federal DBE Program

Caltrans has been implementing some version of a DBE program for federally-funded contracts for nearly 25 years. After enactment of the Transportation Equity Act for the 21st Century (TEA-21) in 1998, the U.S. Department of Transportation (USDOT) established a new Federal DBE Program.

Program elements. The elements of the Program are set forth in 49 CFR Part 26. Race- and gender-conscious measures such as DBE contract goals may be used if necessary, but are not required in a state's implementation of the Federal DBE Program. Until May 1, 2006, Caltrans had used DBE contract goals for federally-funded contracts. In response to new guidance from the courts and from USDOT, Caltrans discontinued use of DBE goals on its contracts as of May1, 2006 and prohibited local agencies from using DBE goals on federally-funded contracts administered by Caltrans. Caltrans has implemented an all race- and gender-neutral Program since May 1, 2006.

Figure I-1.
Caltrans districts and regions

Race/ethnic/gender groups. Disadvantaged business enterprises (DBEs) are defined in the Federal DBE Program (49 CFR Section 26.5). A DBE is a small business owned and controlled by one or more individuals who are socially and economically disadvantaged. The Federal DBE Program specifies the race, ethnic and gender groups that can be presumed to be disadvantaged as well as definitions of when other firms may be socially and economically disadvantaged (explained in Appendix A). These groups are:

- Black Americans (or "African Americans" in this study);
- Hispanic Americans;
- Native Americans;
- Asian-Pacific Americans;
- Subcontinent Asian Americans; and
- Women of any race or ethnicity.

There is a gross revenue limit ($19,570,000) and a personal net worth limit ($750,000, not including equity in the business and in personal residence) that firms and firm owners must fall below to be able to be certified as a DBE (49 CFR Subpart D). In this study:

- "DBEs" refer to disadvantaged business enterprises according to the federal definitions in 49 CFR Part 26 that have been certified as such.
- "MBEs" and "WBEs" refer to firms owned and controlled by minorities or women, according to the race/ethnicity definitions listed above, whether or not they are certified.

Legal Requirements for Caltrans Implementation of the Federal DBE Program

The new Federal DBE Program that the federal government developed in 1998 responded to the 1995 U.S. Supreme Court decision in *Adarand Constructors, Inc. v. Pena*.[1] The Court held that a federal program utilizing a racial classification is only constitutional if it serves a "compelling interest" and is "narrowly tailored" to achieve that objective.

Difference between implementing a federal program and a state or local program. In *Adarand*, the U.S. Supreme Court extended the same standard for review of federal programs that the Court had applied in 1989 to state and local governments in *City of Richmond v. J.A. Croson*.[2] After the *Croson* decision, many state and local minority- and women-owned business enterprise programs (non-federal programs) were held to be unconstitutional by the courts. The state and local programs found to be unconstitutional included a State of California construction subcontracting program for minority- and women-owned businesses on state-funded contracts.

Proposition 209, passed by California voters in 1996, also precludes the State from implementing race- and gender-conscious programs related to non-federally-funded contracts. As it provides for continued implementation of federally-required programs, Proposition 209 does not apply to Caltrans' implementation of the Federal DBE Program.

Appendix B (Legal Environment for Caltrans DBE Program) summarizes certain key federal court decisions affecting race- and gender-conscious programs implemented by public agencies.

Requirements for implementing the Federal DBE Program. As a recipient of USDOT funds, Caltrans is required to implement the Federal DBE Program, and to narrowly tailor its implementation given factors affecting the California transportation construction and engineering marketplace. The current Federal DBE Program provides regulations that state and local governments must follow. Caltrans must:

- Set an overall annual goal for DBE participation in Caltrans' federally-funded contracts;
- Examine whether or not the annual DBE goal can be attained solely through neutral measures or whether race- or gender-based measures are needed;
- Choose the measures it will apply in an attempt to meet the annual DBE goal; and
- Identify the specific race, ethnic and gender groups that will be eligible for any race- or gender-conscious measures such as contract goals.

[1] 515 U.S. 200 (1995).

[2] 488 U.S. 469 (1989).

Overall annual DBE goal. Even though the Federal DBE Program outlined in 49 CFR Part 26 includes an overall 10 percent aspirational goal for DBE participation across the nation, state and local governments receiving USDOT funds must set an annual DBE goal specific to conditions in their relevant marketplace. The Federal DBE Program requires an agency such as Caltrans to set an annual DBE goal whether or not its program utilizes race- or gender-conscious measures such as DBE contract goals.

Measures required to attempt to meet the goal. The Federal DBE Program requires state and local governments to assess how much of the annual DBE goal can be met through race- and gender-neutral efforts and what percentage, if any, should be met through race- and gender-based efforts such as DBE contract goals. The state or local government must then select specific measures it will use in implementing the Program.

The 2005 Ninth Circuit decision in *Western States Paving Co. v. Washington State DOT* sets requirements that Caltrans must follow in implementing the Federal DBE Program.[3] In this decision, the court held that state and local governments are responsible for determining whether or not there is discrimination in the local transportation contracting industry, and for developing narrowly tailored measures if a need exists, in order to comply with the Federal DBE Program. The court found that sufficient evidence of discrimination exists nationwide to hold that the Federal DBE Program was constitutional. The court also held that narrow tailoring of the program depends on each state or local government evaluating conditions within its own contracting markets.

Accordingly, the USDOT has advised state and local agencies that any use of race- or gender-conscious remedies as part of its DBE program must be based on evidence the recipient has concerning discrimination affecting the local transportation contracting industry[4]:

- The state or local agency determines whether or not there is evidence of discrimination in its transportation contracting industry.
- The USDOT recommends the use of disparity studies to examine whether or not there is evidence of discrimination, and how remedies might be narrowly tailored.
- The USDOT suggests consideration of both statistical and anecdotal evidence. "Disparity analysis," or comparisons of DBE utilization with the relative availability of DBEs to perform the work, is an important part of the statistical information.
- Evidence must be considered for individual race, ethnic and gender groups.

This Interim Report initiates the process of evaluating whether or not there is evidence of discrimination and the need for specific program elements.

[3] *Western States Paving Co. v. Washington State DOT*, 407 F.3d 983 (9th Cir. 2005)

[4] Questions and Answers Concerning Response to *Western States Paving Company v. Washington State Department of Transportation* [hereinafter DOT Guidance], available at http://www.fhwa.dot.gov/civilrights/dbe_memo_a5.htm. (January 2006).

Summary of Study Elements

Each portion of this Interim Report integrates with other elements:

- **Background information.** Definitions of terms (Appendix A) and a summary legal analysis (Appendix B) are included as reference.

- **Relative availability of MBEs and WBEs in the transportation construction and engineering industry in California.** BBC completed telephone interviews with 18,675 construction and engineering-related businesses in California. The resulting database of firms that reported themselves to be available for transportation construction and engineering-related work forms the basis for the MBE/WBE availability analysis. Section II of the Interim Report presents the study team's results. Appendix C (Availability Survey) reviews the survey process in detail. Appendix D (Procedures for Estimating MBE/WBE Availability) describes the methodology used for estimating MBE/WBE availability.

- **Types and location of Caltrans contracts and subcontracts.** The study team collected information on more than 10,000 prime contracts and subcontracts. The study period for this analysis is January 1, 2002 through December 31, 2006. Appendix D documents the study team's data collection efforts.

- **Analysis of any barriers to entry.** The federal government cites conditions ranging from barriers in employment and training opportunities to disparities regarding access to capital and bonding as reasons for the Federal DBE Program. Courts have considered this evidence and held that it meets constitutional standards for Congressionally-adopted legislation and regulations that include race- and gender-based programs.

  The study team examines whether certain barriers identified for the transportation industry for the nation as a whole apply to the transportation construction and engineering industry in California. Section III examines training and education, employment opportunities, opportunities for advancement, business ownership rates and access to capital. Appendix E (Analysis of U.S. Census of Population Data) documents related methodology.

- **Initial recommendations.** BBC recommends certain improvements to Caltrans' tracking of program performance. As these recommendations do not depend on ultimate study findings in the Final Report, they are presented in the Interim Report (see Section IV).

BBC's Next Steps

BBC will collect and analyze additional quantitative and qualitative information on the California marketplace and Caltrans' and local agencies' transportation construction and engineering contracts. BBC will examine whether there are disparities between utilization and relative availability of MBEs and WBEs to perform this work. The disparity analysis will encompass both federally-funded contracts and state-funded contracts (which have not had DBE goals during the study period).

Caltrans is scheduling public hearings for spring 2007 to hear testimony related to issues discussed in this Interim Report and other topics. BBC will consider this information before preparing the final report.

The Final Report will compile this information to assist Caltrans in making the following determinations:

- Level of overall annual DBE goal;
- How much of the annual DBE goal can be achieved through neutral measures, and whether race- or gender-based measures are warranted in Caltrans' implementation of the Federal DBE Program; and
- Specific measures to implement the program.

This information will be presented in the Final Report scheduled for June 30, 2007.

SECTION II.
Analysis of MBE/WBE Availability

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Summary

BBC developed a database of firms available to perform specific types of transportation construction and engineering work in different regions of California. Starting with a list of California business establishments identified by Dun & Bradstreet, the BBC study team successfully completed telephone interviews with 18,675 firms concerning their qualifications and interest in Caltrans and local government projects.

Among firms surveyed by BBC for the availability analysis, 3,398 indicated that they perform work related to transportation construction and engineering, were qualified and interested in future work with Caltrans or local governments, had made past attempts to obtain this work and identified the regions in which they work. In BBC's analysis, this subset of firms is "available" for specific types and locations of future prime contract or subcontract work in federally-funded contracts. Among these firms, 32 percent reported that they were minority- or women-owned. Fewer than one-in-four minority- and women-owned firms available for transportation construction and engineering work were DBE certified. Many firms have not actively pursued DBE certification.

BBC created a statistical model to examine the share of total contract dollars MBEs and WBEs would obtain if each available minority- or woman-owned firm from the telephone survey had the same chance of obtaining a specific prime contract or subcontract as a majority-owned firm available for the same types of work. To perform this analysis, BBC developed a database of more than 10,000 prime contracts and subcontracts for Caltrans and local agency projects from 2002 through 2006. The model indicates that MBEs and WBEs would receive 17.9 percent of prime contract and subcontract dollars for federally-funded transportation construction and engineering contracts.

The balance of Section II describes research concerning availability of minority- and women-owned firms. Appendix C (Availability Survey) provides additional information on the survey effort.

Measuring MBE/WBE Availability

The BBC study team implemented a strategy for measuring MBE/WBE availability that was consistent with the USDOT's and federal courts' guidance for availability studies.

Determining relevant geographic market area. The study team first confirmed that California is the relevant geographic market area for Caltrans' construction and engineering services contracting. For 2002 through 2006, 95 percent of the dollars going to firms working as prime contractors or subcontractors on Caltrans transportation construction and engineering projects went to firms with locations in California.

Survey of California businesses potentially related to transportation construction and engineering. The study team contacted business establishments in California that had been identified by Dun & Bradstreet (D&B) to be in primary lines of work potentially related to transportation construction and engineering. The study team first purchased all listings of business

establishments in California reported by D&B to have a primary line of work in the Standard Industrial Classification (SIC) codes BBC determined to be most pertinent to Caltrans transportation construction and engineering contracts (49,276 business listings).

The study team attempted to contact each of these potential businesses. The telephone interviews were conducted in the fall of 2006 by Customer Research International (CRI), a telephone survey research firm in Texas that has substantial expertise conducting these types of surveys. (BBC completed the survey effort by faxing and e-mailing surveys to firms that had requested receiving hard copy versions of the survey.)

- These telephone interviews began by confirming that CRI had reached the correct business.
- CRI interviewers then asked the firm owner or manager, "First, I want to confirm that your firm does work related to transportation construction, maintenance or design. Is this correct?" Interviews continued with firms responding "yes" to this question. Interviewees were told that this included trying to sell this work, not just successfully performing this work.
- CRI interviewers also confirmed or refined the D&B information concerning primary type of work performed by the firm.
- The survey collected information on the geographic scope of that work within the state, specific interest in Caltrans work, and past bidding and performance of transportation construction and engineering contracts for Caltrans, local governments and the private sector.
- Firms were asked to identify the largest contract or subcontract performed or bid on in the past five years.
- Interviewers asked firms whether they were qualified and interested in work for Caltrans and/or local governments. Separate questions asked about qualifications and interest in this work as a prime contractor and as a subcontractor.
- The survey asked firms whether they were owned and controlled by minorities and/or women.
- Other firm characteristics were collected as well (see Appendix C).

Strengths of a "custom census" approach. The study team determined that a telephone survey of firms in California was a preferable approach to analyzing availability than relying on: (a) firm counts from the DBE directory and U.S. Census data; (b) pre-qualification lists, which is not a standard Caltrans practice; or (c) a bidders list, which has not yet been successfully implemented by Caltrans.

"Custom census" approaches to availability that begin with D&B data have been reviewed positively by federal courts. The study team's methodology for analyzing MBE/WBE availability takes the previous custom census approach as a starting point and added several layers of additional screening when determining firms available for transportation construction and engineering work.

Survey performance. The availability analysis conducted for Caltrans represents the largest survey to date of potentially available firms conducted in any state or local government disparity study known to the study team. The study team attempted to complete surveys with all firms in California reported by D&B to have a primary line of business within transportation construction and

engineering-related SIC codes. (There was no "sampling" from the sample frame in preparing the list of firms to be surveyed.)

The study team obtained completed surveys from 18,675 business establishments, or about 47 percent of the business establishments with valid phone listings, which is relatively high for this type of research. Of the 18,675 firms successfully interviewed, 3,398 were for-profit firms reporting that they:

- Perform work related to transportation construction, maintenance or design (in the lines of business pertinent to this study and after combining multiple responses for firms with more than one office);
- Are qualified and interested in performing transportation-related work for Caltrans and/or local governments in the future, as a prime contractor and/or subcontractor (or supplier or trucker);
- Have attempted to obtain this work in the past (in the public or private sector); and
- Indicated the regions of the state in which they can perform work.

Preliminary Results of the Availability Analysis

In the 2006 Availability Survey, 3,398 firms in the transportation construction and engineering industry reported qualifications and interest in future Caltrans and/or local government transportation work and had performed or bid on such work in the past. Of these firms, 32 percent reported that they were minority- or women-owned (see Figure II-1).

Figure II-1.
MBE/WBEs as a share of firms available for future transportation contracting work

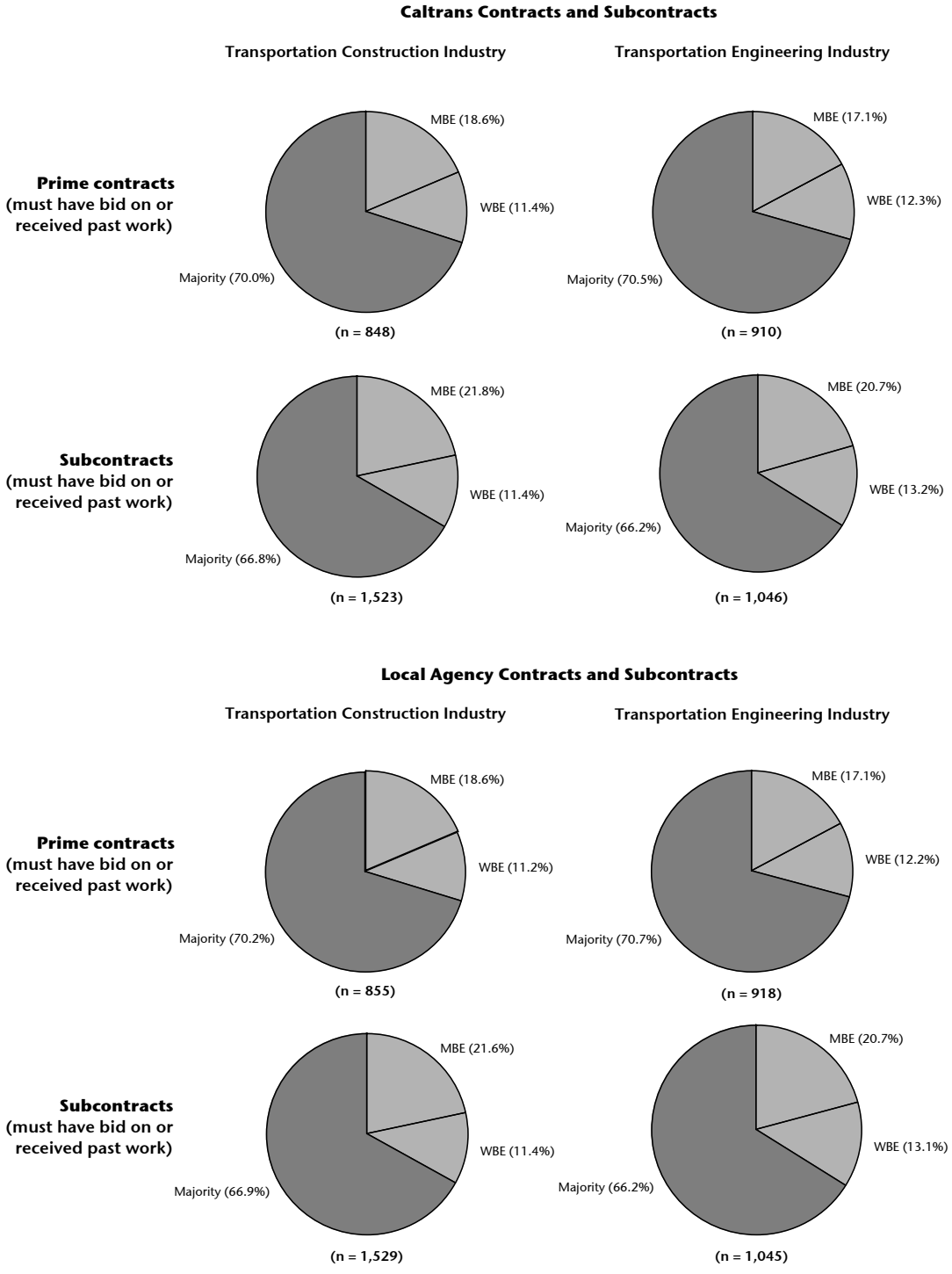
Note:
Unweighted. Preliminary results, subject to refinement.

Source:
BBC Research and Consulting from 2006 Availability Survey.

Firms available by location. Relative MBE/WBE availability does not vary considerably between districts. This is because firms located in one district often work across a number of districts.

Firms available by sector and work role. BBC also examined MBE/WBE availability by sector and work role and by discipline. Figure II-2 on the following page shows the shares of minority- and women-owned firms available within these sub-categories of available firms.

Figure II-2.
MBEs/WBEs as a percentage of transportation construction and engineering industry firms qualified and interested in transportation work



Note: WBE is white woman-owned firms.

Source: BBC Research and Consulting from 2006 Availability Survey.

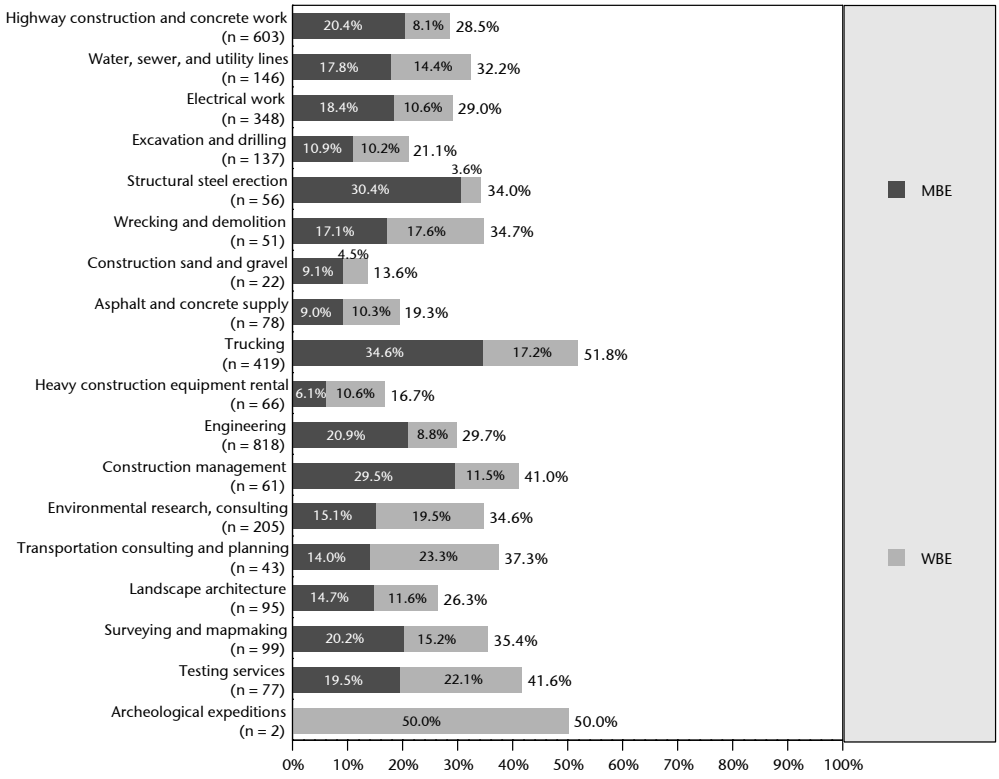
Among transportation construction industry firms reporting qualifications and interest in future Caltrans transportation work as a prime (and had bid or received work as a prime on past transportation work in the public or private sectors), 30.0 percent are MBEs or WBEs. MBEs and WBEs are 33.2 percent of transportation construction industry firms reporting qualifications and interest in future Caltrans work as a subcontractor or supplier.

MBEs and WBEs comprise 29.4 percent of transportation engineering industry firms qualified and interested in future Caltrans work as a prime consultant (and had bid or received work as a prime in the past). Among transportation engineering industry firms qualified and interested in future Caltrans work as a subconsultant, 33.8 percent are MBEs or WBEs.

The study team also examined firms reporting qualifications and interest in local government transportation work (and had bid or submitted price quotes on past transportation work). Compared with results for Caltrans contracts, there are no material differences in the percentage of minority- and woman-owned firms available for local government prime contracts and subcontracts.

Firms available by discipline. BBC grouped different types of work involved in Caltrans construction and engineering contracts into 18 disciplines shown in Figure II-3. Approximately 28.5 percent of highway construction and concrete work firms are minority- or woman-owned. About 29.7 percent of available engineering firms are MBEs or WBEs.

Figure II-3.
MBE/WBEs as a percentage of transportation construction and engineering industry firms available for Caltrans and local government transportation work



Source: BBC Research & Consulting from 2006 Availability Survey.

Dollar-weighted MBE/WBE Availability

BBC developed a statistical model that examined thousands of prime contracts and subcontracts for Caltrans, local government and SR 125 projects from 2002 through 2006. For each contract element, BBC estimated the number of minority- and woman-owned firms and the total number of firms surveyed that were available for that work based on:

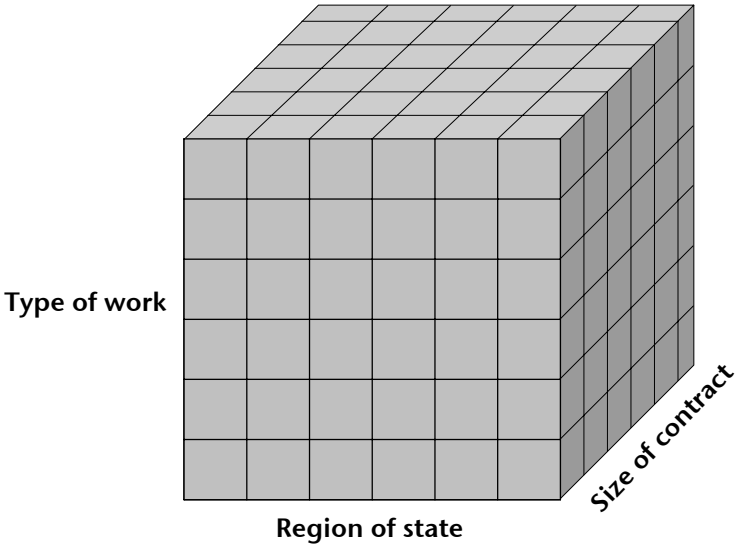
- Specialization of work;
- Prime contract versus subcontract role;
- Location of work;
- Size of contract or subcontract element;
- Contract date; and
- Caltrans versus local agency project;

BBC then weighted the relative MBE/WBE availability for each contract element by the dollars for that element. The statistical model indicates that MBEs and WBEs would receive 17.9 percent of prime contract and subcontract dollars for federally-funded transportation construction and engineering contracts.

Matrix of relative MBE/WBE availability estimates. Figure II-4 shows a matrix of the database developed through this availability analysis. The study team separately tracks available firms for each cell of this matrix. Relative MBE/WBE availability within a cell is determined by dividing the number of MBEs and WBEs in that cell by the total number of firms in the cell.

Figure II-4.
Matrix for the MBE/WBE availability analysis

Source:
BBC Research and Consulting, 2006.



If ABC Company is qualified and interested in performing electrical work as a subcontractor on Caltrans contracts in the San Diego area and performs only small subcontracts, it is shown as an available firm for only that type and size of work as a subcontractor for that geographic area. If a company is qualified and interested in working as both a prime contractor and a subcontractor, and operates across a broad geographic area, then the firm may count as an available business in many different cells of the matrix. The relative MBE/WBE availability for each cell of the matrix is given by the number of MBEs and WBEs in that cell divided by the total number of firms in the cell.

Specialization of work. The USDOT suggests considering the availability of firms based on their ability to perform specific types of work. The example USDOT gives in Tips for Goals Setting in the Disadvantaged Business Enterprise (DBE) Program, which is cited in the *Northern Contracting* decision[1], is as follows: If 90 percent of an agency's contracting dollars is spent on heavy construction and 10 percent on trucking, the agency would calculate the percentage of heavy construction firms that are MBEs or WBEs and the percentage of trucking firms that are MBEs or WBEs, and weight the first figure by 90 percent and the second figure by 10 percent when calculating overall MBE/WBE availability.[2]

Qualifications and interest in prime contractor versus subcontractor work. Although not a requirement in the Federal DBE Program (and not done by the Illinois Department of Transportation in the information reviewed by the Seventh Circuit in *Northern Contracting*[3]), BBC had information on whether firms reported qualifications and interest in working as a *prime contractor* and as a *subcontractor*. In BBC's statistical model, only firms qualified and interested in prime contracts are counted as available for prime contracts. Firms reporting qualifications and interest in subcontracts are counted as available for these contract components. Many firms reported qualifications and interest in both contract roles, and are counted as available when considering both prime contracts and subcontracts.

Location of work. BBC considered the specific regions within California in which firms work in the statistical model. For example, firms that report they could work in the San Francisco Bay Area, but not other regions of the state, are only considered available for work in that geographic area (Caltrans District 4 contracts and work with local agencies located within District 4). Firms operating throughout the state are considered available for work in all regions.

BBC examined work in 12 different regions that correspond to individual Caltrans districts. The effect of this geographic weighting is that firms working throughout the state figure more prominently in the availability calculation than firms working in just one part of the state. The weighting process is described in more detail later in this section.

Size of contract or subcontract element. In counting available firms, BBC also considered whether a firm had previous work experience on a project of equivalent size (in dollars) to the specified contract or subcontract element. To be counted as available for subcontract elements, a firm must have been awarded or bid on a past contract or subcontract of similar or greater size to that for the contract element. For prime contract elements, a firm must have been awarded or bid on a past contract or subcontract of similar or greater size to the entire contract amount.

Contract date. Similarly, to be counted as available for a contract element (both prime contract and subcontract elements), a firm must report an establishment date during or prior to the year in which that prime contract began. Firms that could not recall or did not report an establishment date were presumed to have been founded prior to the study period.

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[1] 473 F.3d at 723.

[2] Tips for Goals Setting in the Disadvantaged Business Enterprise (DBE) Program, http://osdbu.dot.gov/?TabId=133.

[3] 473 F.3d at 723.

Caltrans versus local agency projects. The study team developed separate availability matrices for firms qualified and interested in Caltrans work and firms qualified and interested in local government transportation work. If a firm reported qualifications and interest in both Caltrans and local government work, it was included in both matrices. The study team separately examined firms qualified and interested in prime contract work (or both prime/sub work) from firms that reported themselves to be qualified and interested in subcontract, supply or trucking work (which also includes some potential prime contractors).

Weighting of individual availability estimates. The final step of the availability analysis is to combine the MBE/WBE availability figures for multiple cells to develop aggregate availability figures across many different types of contracts across regions in the state. In general terms, the study team weights the MBE/WBE availability in a cell by the relative dollars of work in that cell and then sums the weighted availability data to determine an aggregate figure. BBC performed this analysis for each of the prime contract and subcontract elements examined in the study, and then combined results across thousands of contract elements on a dollar-weighted basis. Appendix D (Procedures for Estimating MBE/WBE Availability) explains the collection and analysis of Caltrans contract data necessary to perform this dollar weighting.

SECTION III.
Entry into the Industry

SECTION III.
Entry into the Industry

Summary

As discussed in Appendix B (Legal Environment for Caltrans DBE Program), federal courts have held that Congress had ample evidence of discrimination in the transportation contracting industry in upholding the constitutionality of the Federal DBE Program (TEA-21), and the federal regulations implementing the program (49 CFR Part 26). Specifically, the federal courts found Congress "spent decades compiling evidence of race discrimination in government highway contracting, of barriers to the formation of minority-owned construction businesses, and of barriers to entry."[1] Congress found that discrimination had impeded the formation of qualified minority business enterprises.

BBC examined whether some of these barriers to entry found for the nation as a whole also appear to occur in California. BBC separately studied barriers to entry for construction and for engineering. Entrance requirements and opportunities for advancement differ for these two branches of the overall transportation contracting industry.

BBC's analysis suggests that barriers to entry into the transportation construction and engineering industry may begin with the education and training and continue through forming a business and gaining access to capital based on preliminary analysis in this Interim Report. Initial results include:

- College education appears to be a barrier for African Americans, Hispanic Americans and Native Americans. Disparities in educational attainment for African Americans and Hispanic Americans appear at the high school level, which may affect college opportunities. These factors may affect entrance of African Americans, Hispanic Americans and Native Americans into the engineering industry.
- There is low representation of women among civil, environmental and geological engineers.
- African Americans, Asian-Pacific Americans, Hispanic Americans and women working in the engineering industry are less likely to be business owners than others in the industry.
- Representation of African Americans in the construction industry is relatively low compared to other industries in the California, even among entry level jobs. The representation of women in construction as a whole is relatively low, and very few women are in the construction trades involved in transportation construction.
- There appear to be disparities in the advancement of Hispanics to certain construction occupations and first-line supervisor positions. Relatively few African Americans, Hispanic Americans and women working in construction are managers.
- African Americans, Hispanic Americans, Subcontinent Asian Americans and women in construction are less likely than non-Hispanic whites to own construction businesses.

[1] *Sherbrooke Turf, Inc.*, 345 F.3d at 970, (*citing Adarand Constructors, Inc.*, 228 F.3d at 1167 – 76); *Western States Paving Co. v. Washington State DOT*, 407 F.3d 983 (9th Cir. 2005) at 992.

There is evidence that minority-owned firms face disadvantages in accessing capital necessary to start and expand businesses:

- Relatively fewer African Americans, Hispanic Americans and Native Americans in California own homes than non-Hispanic whites, and those who do own homes tend to have lower home values. Home equity is an important source of capital for business start-up and growth.
- African Americans, Asian Americans, Hispanic Americans and Native Americans applying for home mortgages are more likely than non-minorities to have their applications denied.
- African American, Hispanic American and Native American mortgage borrowers are more likely to have subprime loans.
- African American-, Asian American- and Hispanic American-owned businesses have higher denial rates when applying for business loans, and when they receive loans, have lower loan amounts.
- Relatively more African American- and Hispanic American-owned firms that need credit do not apply for loans because they fear being denied the loan.

The Final Report will further explore these issues through additional quantitative analyses and collection and analysis of qualitative information. BBC will also examine initiatives currently in place that strive to create a level playing field for entry into these industries. The Final Report will include recommendations to assist Caltrans in considering any new neutral or race- and gender-based programs to combat identified barriers for minorities and women.

The balance of Section III examines Interim Report research results in detail, following the outline presented in Figure III-1 on the following page.

Education and Training

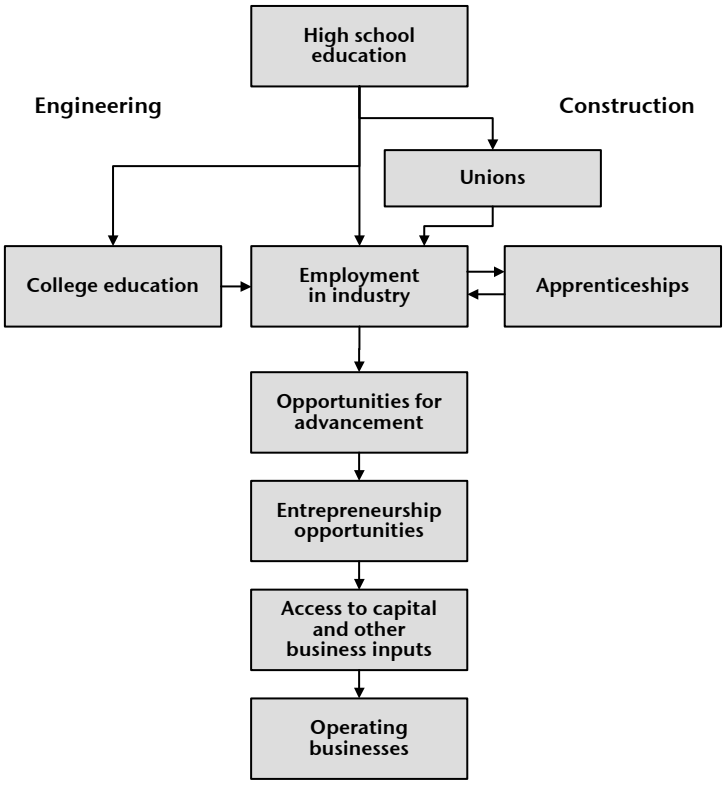
The paths to job opportunities, whether they be union programs to learn a trade or four-year college degrees in engineering, are important to understanding whether barriers affect employment opportunities for minorities and women that eventually affect the relative number of minority and female business owners.[2]

Construction. Construction industry employees in California typically have a high school degree with little or no college education. Based on the 2000 Census of Population, 28 percent of workers in construction were just high school graduates and 32 percent had not finished high school. Only 10 percent of people working in construction had a four-year college degree. Formal education beyond high school is not a prerequisite for most construction industry jobs.

[2] Feagin, Joe R. and Nikitah Imani. 1994. Racial Barriers to African American Entrepreneurship: An Exploratory Study." *Social Problems*. 41 (4): 562-584.

Figure III-1.
Model for studying the entry into industry

Source:
BBC Research and Consulting.



Training is largely on-the-job and through trade schools and apprenticeship programs. Entry level jobs for workers out of high school are often laborers, helpers or apprentices. More skilled positions may require additional training through a technical or trade school or through an apprenticeship or other employer-provided training program. Apprenticeship programs can be developed by employers, trade associations, trade unions and other groups. Workers can enter apprenticeship programs from high school or a trade school. Apprenticeships have traditionally been three- to five-year programs that combine on-the-job training with classroom instruction.[3]

In the California workforce, African Americans and Hispanic Americans comprise a relatively large share of workers with just a high school education. In 2000, only 21 percent of African American workers 25 and older in California had a college degree, much lower than the 38 percent of non-Hispanic white workers in this age group. About 9 percent of Hispanic American workers and 19 percent of Native American workers in California had college degrees.

From these data, educational attainment does not appear to be a barrier for entry of minorities in the construction industry. Based on education requirements of entry level jobs and the limited education beyond high school for many African Americans, Hispanic Americans and Native Americans in California, one would expect a relatively high representation of these minority groups in the California construction industry.

[3] Bureau of Labor Statistics, U.S. Department of Labor. 2006-07. "Construction." C*areer Guide to Industries.* http://www.bls.gov/oco/cg/cgs003.htm (accessed February 15, 2007).

However, given high educational levels of Asian-Pacific Americans and Subcontinent Asian Americans (among workers 25 and older, 45 percent and 67 percent of these groups have college degrees, respectively), representation of these groups in construction might be low relative to non-Hispanic whites.

The percentage of women working in California with just a high school diploma is similar to that of men based on 2000 Census of Population data.

Engineering. More than half (58 percent) of the individuals working in the engineering industry have at least a four-year college degree. When only examining people who work as engineers, this percentage increases to 82 percent.[4]

The level of education needed to become an engineer is a barrier for African Americans and Hispanic Americans. Very few Hispanic Americans and relatively few African Americans and Native Americans working in the state had a degree from a four-year college in 2000.

Figure III-2 examines the percentage of workers 25 and older who have at least a four-year degree, across all industries. About 39 percent of non-Hispanic whites working in California had at least a four-year college degree in 2000. Relatively fewer Hispanic Americans, African Americans and Native Americans working in the state had college degrees. Relatively more Asian-Pacific Americans and Subcontinent Asian Americans had college degrees than non-Hispanic whites.

About as many women as men, have college degrees in California.

Figure III-2.
Percentage of all workers 25 and older with at least a four-year degree in California and the U.S., 2000

California	Percentage of workers		United States	Percentage of workers	
Race/ethnicity			**Race/ethnicity**		
African American	20.9 %	**	African American	17.2 %	**
Asian-Pacific American	44.7	**	Asian-Pacific American	43.5	**
Subcontinent Asian American	67.2	**	Subcontinent Asian American	66.8	**
Hispanic American	9.1	**	Hispanic American	12.1	**
Native American	19.1	**	Native American	15.9	**
Other minority group	32.7	**	Other minority group	29.0	**
All minority groups	21.1	**	All minority groups	20.0	**
Non-Hispanic white	38.5		Non-Hispanic white	31.0	
Gender			**Gender**		
Female	29.8	**	Female	27.6	**
Male	30.6		Male	28.4	

Note: ** Denotes that the difference in proportions between the minority and non-Hispanic white groups (or female and male gender groups) is statistically significant at the 95% confidence level.

Source: BBC Research and Consulting from 2000 U.S. Census 5% Public Use Micro-sample data. The raw data extract was obtained through the IPUMS program of the MN Population Center: http://usa.ipums.org/usa/.

[4] BBC Research and Consulting from 2000 U.S. Census 5% Public Use Micro-sample data. The raw data extract was obtained through the IPUMS program of the MN Population Center: http://usa.ipums.org/usa/.

Additional indices of high school educational attainment. Because of the importance of college admission as a step in entering the engineering industry, the study team examined additional information on the educational achievement of minority high school students in California. The California Legislative Black Caucus published a report in early 2007 that included indices of high school achievement for African Americans, Asian Americans, Hispanic Americans and non-Hispanic whites. The study team translated the reported statistics into indices where 100 is the value for non-Hispanic white students. A figure lower than 100 indicates a lower rate for minority students.

As shown in Figure III-3 on the following page, high school achievement indices ranged from 52 to 88 for African American students and from 59 to 88 for Hispanic American students. For example only 25.2 percent of African American students had completed necessary courses for admission to a University of California or California State University school in 2004-2005. This was far below the rate for non-Hispanic white students (40.9 percent). The study team created an "index" for African American student achievement for completion of necessary courses by dividing 25.2 percent into 40.9 percent, yielding "62." Hispanic American students had an achievement index of 59 when compared with non-Hispanic white students completing courses for U.C./C.S.U. entrance.

Other notable indices for African Americans included:

- Passing the high school exit exam for English at a rate roughly one-half that of non-Hispanic white students;
- Passing the high school exit exam for math at less than two-thirds the rate of non-Hispanic white students; and
- Having a high school dropout rate more than twice that of non-Hispanic white students.

The achievement index with the least disparity between African Americans and whites was reading scores from the standardized achievement test administered to students in the 11th grade.

Hispanic American students, on average, exhibited similar disparities in achievement as found for African American students. Hispanic American students were closer to non-Hispanic white students in the rate of passing the high school exit exam for math. High school dropout rates were lower for Hispanic Americans than for African Americans, but still double that of non-Hispanic whites. Overall, the California Legislative Black Caucus report showed educational outcomes for Asian American students to be on par with non-Hispanic whites.

It appears that disparities in educational achievement in high school or in prior grades are important in explaining the relatively low number of African Americans and Hispanic Americans that have college degrees in California. There are many studies throughout the nation that consider whether the causes of the disparities in educational outcomes for African American and Hispanic American high school students are affected by discrimination; these are not reviewed here.

Figure III-3.
Indices of high school achievement for African Americans, Asian Americans, Hispanic Americans and Non-Hispanic whites in California, 2004-2005 (white=100)

	African American	Asian American	Hispanic American	Non-Hispanic white
Completed courses for U.C./C.S.U. entrance 2004-2005	62	144	59	100
CAT/6 Reading Scores (11th grade)	88	101	88	100
High school exit exam passing rate: English	52	108	64	100
High school exit exam passing rate: Math	62	86	62	100
SAT average score	79	98	83	100
High school dropouts: 1 year rate	275	70	200	100
High school dropouts: 4 year rate	276	70	210	100

Note: Data for completed courses for U.C./C.S.U. entrance were for 2004-2005. Dates not provided in source for other educational statistics.
Source: BBC Research & Consulting from California Legislative Black Caucus. 2007. The State of Black California, Full Report, Sacramento.

Additional factors affecting college engineering programs in California. Historically, college engineering programs in the United States were slow to open doors to minorities such as African Americans.[5] Today, California stands out as having low percentages of African American engineering students. Out of the top 26 engineering schools in 2002, four are University of California campuses (UC Berkeley, UC Los Angeles, UC Santa Barbara, and UC San Diego). A recent study identified these four schools as having the lowest percentages of African American engineering students, ranking at 23rd, 24th, 25th and 26th respectively:[6]

- In fall 2002, the University of California-Berkeley had 65 African American students among 4,941 full-time engineering students (1.4 percent of the engineering students), similar to the absolute number and relative share of engineering students at UCLA.
- There were 23 African Americans among 2,370 total engineering students at UC-Santa Barbara (1.0 percent).
- UC-San Diego had no African Americans among its 5,264 engineering students in fall 2002.

Because the enrollment statistics for engineering students were for 2002, most of these students enrolled in college after Proposition 209 had gone into effect. Many scholars blame Proposition 209 for the relatively low representation of African American and Hispanic American students at more selective colleges in California.[7,8] Proposition 209 changed the ability of California's public colleges to give preferential treatment to minorities and women in college admissions and financial aid unless part of a federal program. This amendment to the California constitution was passed by voters in 1996 and went into effect in 1998.

[5] Unknown Author. 2003. "Blacks Strive to Build a Bridgehead in Academic Engineering." *The Journal of Blacks in Higher Education*. 41 (Autumn): 98-108, 98.

[6] Unknown Author. 2003. "Blacks Strive to Build a Bridgehead."

[7] Contreras, Frances. 2003. "The Reconstruction of Merit Post-Proposition 209." *Educational Policy*. 19 (2): 371-395.

[8] Karabel, Jerome. 1999. "The Rise and Fall of Affirmative Action at the University of California." *The Journal of Blacks in Higher Education*. 25 (Autumn): 109-112.

To understand the broader patterns of enrollment by race and ethnicity in the four University of California schools with the highest-rated engineering programs, the study team examined African American, Hispanic American and Native American enrollment as freshmen in 1995 and in 2003. As shown in Figure III-4:

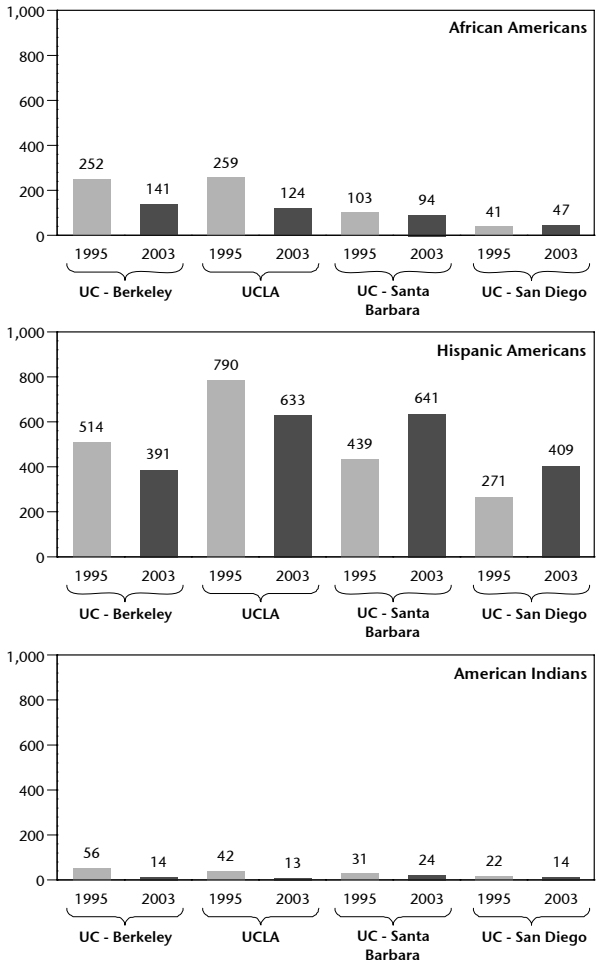
- Enrollment of African American students was cut by half for UC-Berkeley and UCLA between 1995 and 2003. There was little overall change for UC-Santa Barbara and UC-San Diego.
- Declines in enrollment of Hispanic Americans also occurred at UC-Berkeley and UCLA. Enrollment of Hispanic Americans increased at UC-Santa Barbara and UC-San Diego.
- Enrollment of Native Americans dropped markedly at each of the four University of California campuses.

Total enrollment at each campus grew over this period, with non-Hispanic white and Asian-Pacific students accounting for most of the increases. The enrollment declines for African American and Hispanic American students between 1995 and 2003 were because of fewer offers of admission from these schools; applications from African American and Hispanic American students actually increased over this period.

Figure III-4.
Enrollment of resident California freshman at selected University of California campuses

Source:

UC Office of the President, Student Academic Services, IA&SA, REG004/006 and campus reports, Jan 04 f03/flowfrc_0395.



Employment

With educational opportunities and attainment for minorities and women as context, the study team examined employment in construction and engineering in California.

Construction. Based on 2000 Census of Population data, nearly one-half of people working in the California construction industry in 2000 were minority. Of the people working in construction:

- 37 percent were Hispanic Americans;
- 4 percent were African Americans;
- 4 percent were Asian-Pacific Americans;
- 1.5 percent were Native Americans; and
- 0.2 percent were Subcontinent Asian Americans.

Representation of Hispanic Americans in the construction industry is considerably higher than for all industries as a whole (37 percent in construction and 29 percent in all industries in California). U.S. Census of Population data for 2000 showed that 16 percent of people working in construction in California were Hispanic Americans, about the same as for all industries in the state in that year.

African Americans and Asian-Pacific Americans working in California are relatively less likely to work in construction:

- Asian-Pacific Americans were 4.0 percent of the construction workforce and 11.2 percent of all workers in California in 2000 (a statistically significant difference). The fact that Asian-Pacific Americans are more likely to go to college than other groups may explain part of this difference.
- African Americans were 4.3 percent of the construction workforce and 6.5 percent of all workers in California (a statistically significant difference). Average educational attainment of African Americans is consistent with requirements for construction jobs, so education cannot explain the difference. A number of studies throughout the United States have argued that race discrimination by construction unions have held down employment of African Americans in construction trades.[9]
- Relative under-representation of African Americans and Asian-Pacific Americans was found in both 1980 and in 2000.[10] For example, 4.0 percent of construction industry workers were African American in 1980 compared with 4.3 percent in 2000.

[9] Waldinger, Roger and Thomas Bailey. 1991. "The Continuing Significance of Race: Racial Conflict and Racial Discrimination in Construction." *Politics & Society*, 19(3).

[10] Note that Census definitions of race and ethnicity have changed over time, which affects comparability of statistics from one census year to the next. Appendix E (Analysis of U.S. Census of Population Data) discusses how BBC coded data concerning race and ethnicity for each decennial census.

Between 1980 and 2000, the share of construction workers in the United States who are women increased from 8.9 percent to 10.2 percent. In 2000, 9.9 percent of people working in the California construction industry were women, slightly less than in 1980. Figure III-5 compares the composition of the California construction industry with the total California workforce.

Figure III-5.
Demographics of workers in construction and all industries in California and the US, 1980 and 2000

California				
	Construction		All industries	
	1980 (n = 39,196)	2000 (n = 60,113)	1980 (n = 679,838)	2000 (n = 966,244)
Race/ethnicity				
African American	4.0 % **	4.3 % **	6.6 %	6.5 %
Asian-Pacific American	1.9 **	4.0 **	5.0	11.2
Subcontinent Asian American	0.1 **	0.2 **	0.2	1.1
Hispanic American	15.6 **	36.9 **	16.7	29.0
Native American	1.3 **	1.5 **	0.9	1.2
Other minority group	0.2	0.9	0.2	0.9
Total minority	23.1 %	47.8 %	29.6 %	49.7 %
Non-Hispanic white	77.0 **	52.2 **	70.4	50.3
Total	100.0 %	100.0 %	100.0 %	100.0 %
Gender				
Female	10.3 % **	9.9 % **	45.9 %	46.5 %
Male	89.7 **	90.1 **	54.2	53.5
Total	100.0 %	100.0 %	100.0 %	100.0 %
United States				
	Construction		All industries	
	1980 (n = 391,361)	2000 (n = 579,867)	1980 (n = 6,338,776)	2000 (n = 8,295,671)
Race/ethnicity				
African American	7.7 % **	7.5 % **	9.9 %	11.4 %
Asian-Pacific American	0.6 **	1.3 **	1.4	3.4
Subcontinent Asian American	0.1 **	0.2 **	0.2	0.7
Hispanic American	5.7 **	15.8 **	5.6	11.3
Native American	0.9 **	1.6 **	0.6	1.2
Other minority group	0.1	0.4	0.1	0.4
Total minority	15.1 %	26.8 %	17.7 %	28.4 %
Non-Hispanic white	84.9 **	73.2 **	82.3	71.6
Total	100.0 %	100.0 %	100.0 %	100.0 %
Gender				
Female	8.9 % **	10.2 % **	46.0 %	47.9 %
Male	91.1 **	89.8 **	54.0	52.1
Total	100.0 %	100.0 %	100.0 %	100.0 %

Note: ** Denotes that the difference in proportions between the construction and all industry groups for the census year is statistically significant at the 95% confidence level.

Source: BBC Research and Consulting from 1980 and 2000 U.S. Census 5% Public Use Micro-sample data. The raw data extract was obtained through the IPUMS program of the MN Population Center: http://usa.ipums.org/usa/.

Importance of unions in entering the construction industry. Labor scholars characterize construction as a historically volatile industry sensitive to business cycles, making the presence of labor unions important for stability and job security within the industry.[11] The temporary nature of construction work results in uncertain job prospects, and high turnover of laborers presents a disincentive for construction firms to invest in training. Some scholars have claimed that constant turnover has lent itself to informal recruitment practices and nepotism, compelling laborers to tap social networks for training and work. They credit the importance of social networks with the high degree of ethnic segmentation in the construction industry.[12] Unable to integrate themselves into traditionally white social networks, African Americans faced long-standing historical barriers to entering the industry.[13]

Construction unions aim to provide a reliable source of labor for employers and preserve job opportunities for workers by formalizing the recruitment process, coordinating training and apprenticeships, enforcing standards of work and mitigating wage competition. The unionized sector of construction would seemingly be the best inroad for African American and other underrepresented groups into the industry. However, researchers have identified discrimination by trade unions that have historically prevented minorities from obtaining employment in skilled trades.[14]

- Unions have used admissions criteria that adversely affect minorities. Federal courts ruled in the 1970s that standardized testing requirements unfairly disadvantaged minority applicants who had less exposure to testing and that requirements that new union members have relatives in the union perpetuate the effects of past discrimination.[15] More recent disparity studies in California reveal that these practices persist: admissions testing requirements for union membership were still being used that adversely affected minorities,[16] and applicants who were relatives of union members were often waived from admissions requirements.[17]
- Of those minority individuals who are admitted to unions, a disproportionately low number are admitted into apprenticeship programs coordinated by unions. Apprenticeship programs are an important means of producing skilled construction laborers, and the reported exclusion of blacks from these programs has severely limited their access to skilled occupations in the construction industry.[18]

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[11] Applebaum, Herbert. 1999. *Construction Workers, U.S.A*. Westport: Greenwood Press.

[12] Waldinger, Roger and Thomas Bailey. 1991. "The Continuing Significance of Race: Racial Conflict and Racial Discrimination in Construction." *Politics & Society*, 19(3).

[13] Feagin, Joe R. and Nikitah Imani. 1994. "Racial Barriers to African American Entrepreneurship: An Exploratory Study." *Social Problems*. 41(4): 368-370.

[14] U.S. Department of Justice. 1996. Proposed Reforms to Affirmative Action in Federal Procurement. 61 FR 26042.

[15] Ibid. See *United States v. Iron Workers Local 86* (1971), *Sims v. Sheet Metal Workers International Association* (1973), and *United States v. International Association of Bridge, Structural and Ornamental Iron Workers* (1971).

[16] National Economic Research Association, Inc. 1992. *The Utilization of Minority and Woman-Owned Business Enterprises by Contra Costa County*. 185-186.

[17] BPA Economics, Mason Tillman Associates, and Boasberg and Norton. 1990. *MBE-WBE Disparity Study of the City of San Jose*.

[18] Applebaum. 1999. *Construction Workers, U.S.A*.

- While formal training and apprenticeship programs exist within unions, most training of union members takes place informally through social networking. Nepotism characterizes the unionized sector of construction as it does the non-unionized sector, and this favors a white-dominated status quo. [19]

- Traditionally white unions have been successful in resisting policies designed to increase black participation in training programs. The political strength of unions in resisting affirmative action in construction has hindered the advancement of blacks in the industry.[20]

- Discriminatory practices in employee referral procedures, including apportioning work based on seniority, have precluded minority union members from having the same access to construction work as their white counterparts.[21]

- According to testimony from black union members, even when unions implement meritocratic mechanisms of apportioning employment to laborers, white workers are often allowed to circumvent procedures and receive preference for construction jobs.[22]

However, these historical observations may not be indicative of current dynamics in construction unions. For example, the 2006 Current Population Survey (CPS) provides current data on union membership indicating higher union membership for African Americans in construction.[23] The CPS asked participants, "Are you a member of a labor union or of an employee association similar to a union?" CPS data show union membership for African Americans in construction to be higher (17 percent) than non-Hispanic whites (14 percent) On the other hand, only 7 percent of Hispanic Americans are union members based on these national data.

It is unclear from past studies whether unions help or hinder equal opportunity in construction today, and whether effects in California are different from other parts of the country. Also, Hispanic American representation in the national construction industry has seen great advances despite relatively few Hispanics being union members. There are no definitive results in this Interim Report on the role of unions in disparities in African American or Asian-Pacific American employment in construction. This will be a topic of further research in the Final Report.

[19] Ibid. 299. The high percentage of skilled workers reported having a father or relative in the same trade. However, the author suggests this may not be indicative of current trends.

[20] Waldinger and Bailey. 1991. "The Continuing Significance of Race: Racial Conflict and Racial Discrimination in Construction."

[21] U.S. Department of Justice. 1996. Proposed Reforms to Affirmative Action in Federal Procurement. 61 FR 26042. See *United Steelworkers of America v. Weber* (1979) and *Taylor v. United States Department of Labor* (1982).

[22] Feagin and Imani. 1994. "Racial Barriers to African American Entrepreneurship: An Exploratory Study."

[23] 2006 Current Population Survey (CPS), U.S. Census Bureau and Bureau of Labor Statistics.

Engineering industry. The study team also examined race and ethnic composition of the engineering industry in California. Two-thirds of people working in the engineering industry in 2000 were non-Hispanic whites, which is greater than non-Hispanic whites' overall representation across all industries in the state. Asian-Pacific Americans and Subcontinent Asians were also more likely to be employed in the engineering industry than indicated from their representation among all workers in California. These patterns are found in 1980 as well (and for the United States for both 1980 and 2000). Native Americans comprise a small share of engineering industry employees, consistent with Native Americans' share of all California employment.

As shown in Figure III-6 on the following page, African Americans and Hispanic Americans had relatively low representation in the engineering industry:

- African Americans made up a relatively small share of engineering industry workers relative to African Americans' share of employment in other industries in 2000 (3.6 percent compared with 6.5 percent). This was also true in 1980.
- Hispanic Americans were 11.5 percent of engineering industry workers in 2000, less than one-half of Hispanics' representation in the overall California workforce (29.0 percent).

In 2000, women represented 28 percent of engineering industry workers, up from 25 percent in 1980.

Employment patterns seen for California's engineering industry are generally consistent with the nation as a whole.

Figure III-6.
Demographics of workers in the engineering and all industries in California and the U.S., 1980 and 2000

	Engineering		All industries	
California	**1980 (n = 4,457)**	**2000 (n = 9,248)**	**1980 (n = 679,838)**	**2000 (n = 966,244)**
Race/ethnicity				
African American	2.3 % **	3.6 % **	6.6 %	6.5 %
Asian-Pacific American	7.3 **	14.5 **	5.0	11.2
Subcontinent Asian American	0.9 **	1.5 **	0.2	1.1
Hispanic American	7.0 **	11.5 **	16.7	29.0
Native American	0.5 **	1.1	0.9	1.2
Other minority group	0.2	1.0	0.2	0.9
Total minority	18.2 %	33.1 %	29.6 %	49.7 %
Non-Hispanic white	81.8 **	66.9	70.4	50.3
Total	100.0 %	100.0 %	100.0 %	100.0 %
Gender				
Female	25.0 % **	28.5 %	45.9 %	46.5 %
Male	75.0 **	71.5	54.2	53.5
Total	100.0 %	100.0 %	100.0 %	100.0 %
United States	**Engineering**		**All industries**	
	1980 (n = 391,361)	**2000 (n = 579,867)**	**1980 (n = 6,338,776)**	**2000 (n = 8,295,671)**
Race/ethnicity				
African American	3.1 % **	4.3 % **	9.9 %	11.4 %
Asian-Pacific American	2.7 **	4.7 **	1.4	3.4
Subcontinent Asian American	1.0 **	1.3 **	0.2	0.7
Hispanic American	3.5 **	5.7 **	5.6	11.3
Native American	0.4 **	0.8 **	0.6	1.2
Other minority group	0.1	0.4	0.1	0.4
Total minority	10.9 %	17.2 %	17.7 %	28.4 %
Non-Hispanic white	89.2 **	82.8 **	82.3	71.6
Total	100.0 %	100.0 %	100.0 %	100.0 %
Gender				
Female	23.2 % **	27.1 % **	46.0 %	47.9 %
Male	76.8 **	72.9 **	54.0	52.1
Total	100.0 %	100.0 %	100.0 %	100.0 %

Note: ** Denotes that the difference in proportions between the construction and all industry groups for the census year is statistically significant at the 95% confidence level.

The engineering industry sector in 2000 is "architectural, engineering and related services," and in 1980 is "engineering, architectural and surveying services." Though closely related, the groups are not exactly comparable.

Source: BBC Research and Consulting from 1980 and 2000 U.S. Census 5% Public Use Micro-sample data. The raw data extract was obtained through the IPUMS program of the MN Population Center: http://usa.ipums.org/usa/.

The study team also examined the relative number of minorities and women among civil, environmental and mining and geological engineers in California in 2000. Except for Asian-Pacific Americans, the relative number of engineers by race and ethnicity was consistent with each group's representation among all Californians with college degrees. However, 16 percent of people with college degrees in California in 2000 were Asian-Pacific Americans, and Asian-Pacific Americans were 20 percent of engineers in California.

About 14 percent of engineers in California are women, far less than women's share of people with college degrees. Figure III-7 presents these results.

Figure III-7.
Demographics of engineers and workers 25 and older with a college degree in California and the U.S., 2000

California	Engineers (n = 2,482)		Workers 25+ with a college degree (n = 242,421)
Race/ethnicity			
African-American	3.6 %	**	4.5 %
Asian-Pacific American	19.7	**	16.6
Subcontinent Asian American	3.0		2.5
Hispanic American	8.0		8.0
Native American	0.8		0.7
Other minority group	0.8		0.9
Non-Hispanic white	64.1		66.8
Total	100.0 %		100.0 %
Gender			
Female	13.6 %	**	45.9 %
Male	86.4	**	54.2
Total	100.0 %		100.0 %

United States	Engineers (n = 16,342)		Workers 25+ with a college degree (n = 1,846,629)
Race/ethnicity			
African-American	3.9 %	**	6.8 %
Asian-Pacific American	6.3	**	5.3
Subcontinent Asian American	2.6	**	1.7
Hispanic	4.3		4.5
Native American	0.7		0.7
Other minority group	0.4		0.4
Non-Hispanic white	81.7	**	80.6
Total	100.0 %		100.0 %
Gender			
Female	11.8 %	**	47.1 %
Male	88.2	**	52.9
Total	100.0 %		100.0 %

Note: ** Denotes that the difference in proportions between engineers and workers 25+ with a college degree is statistically significant at the 95% confidence level.

Source: BBC Research and Consulting from 2000 U.S. Census 5% Public Use Micro-sample data. The raw data extract was obtained through the IPUMS program of the MN Population Center: http://usa.ipums.org/usa/.

Advancement in Construction

To research opportunities for advancement, the study team examined a number of specific occupations in construction related to transportation construction. Relevant construction trades include:

- Cement masons, concrete finishers, segmental pavers and terrazzo workers, who smooth and finish poured concrete surfaces and work with cement to create sidewalks, curbs, roadways or other surfaces;
- Paving, surfacing and tamping equipment operators, who operate equipment used for applying concrete, asphalt, or other materials to road beds, parking lots, or airport runways and taxiways, or equipment used for tamping gravel and dirt;
- Miscellaneous construction equipment operators, who operate motor graders, bulldozers, scrapers, compressors, pumps, derricks, shovels, tractors, or front-end loaders to excavate, move, and grade earth, erect structures, or pour concrete or other hard surface pavement;

- Electricians, who install, connect, test and maintain building electrical systems, which also can include lighting, climate control, security and communications;
- Structural and reinforcing iron and metal workers, who place and install iron or steel girders, columns and other structural members to form completed structures or frameworks of buildings, bridges and other structures; and
- Construction laborers, who perform a wide range of physically demanding tasks at building and highway construction sites, such as tunnel and shaft excavation, hazardous waste removal, environmental remediation and demolition.

The above definitions are from the U.S. Bureau of Labor Statistics.[24] The U.S. Bureau of Labor Statistics also describes other trades involved in construction, several of which apply directly to transportation construction:

- Truck drivers;
- Crane and tower operators; and
- Dredge, excavating and loading machine and dragline operators.

Finally, the U.S. Bureau of Labor Statistics analyzes first-line supervisors and managers of construction trades and extraction workers.

Management personnel are the most likely of any construction occupation to require a college degree.

Race and ethnic composition of construction trades. There are large differences in the racial and ethnic makeup of workers in different trades related to highway construction based on the 2000 U.S. Census of Population. Figure III-8 on the following page shows the proportion of occupations for people who work in construction in California for 2000. Overall, 48 percent of the construction workforce were minorities (36.9 percent Hispanic Americans and 10.9 percent other minorities). Minorities comprised a relatively large share of the California construction workforce for:

- Construction laborers (68 percent);
- Cement masons, concrete finishers and terrazzo workers (71 percent); and
- Paving, surfacing and tamping equipment operators (62 percent).

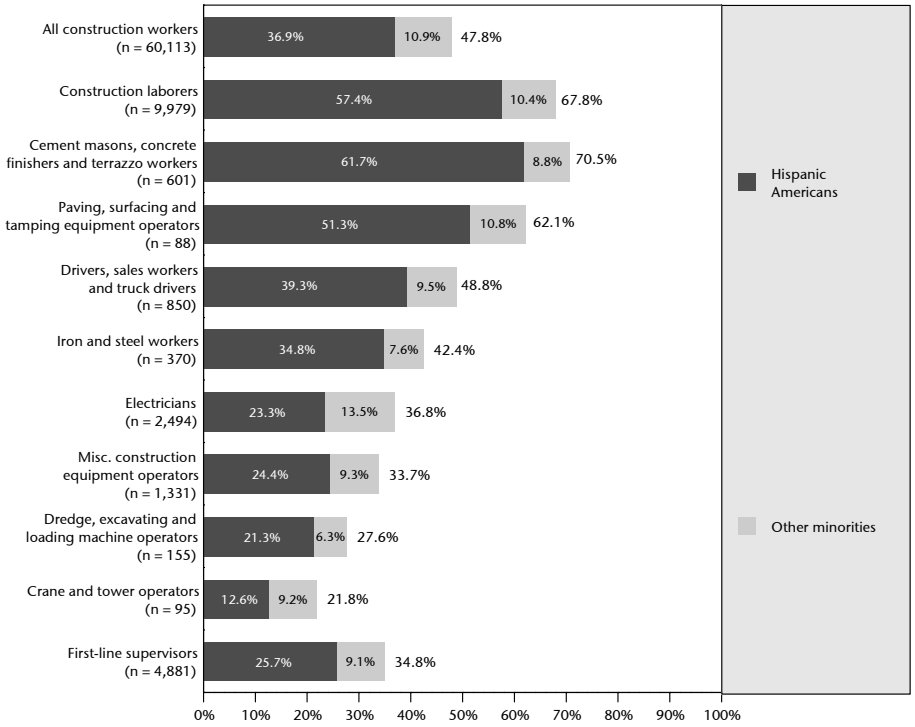
A number of occupations had relatively low representation of minorities:

- Crane and tower operators (22 percent);
- Dredge, excavating and loading machine operators (28 percent);
- Miscellaneous construction equipment operators, (34 percent);
- Electricians (37 percent); and
- Iron and steel workers (42 percent).

[24] Bureau of Labor Statistics, U.S. Department of Labor. 2001. "Standard Occupational Classification Major Groups." http://www.bls.gov/soc/soc_majo.htm (accessed February 15, 2007).

About 35 percent of first-line supervisors of construction workers were minorities, less than minorities' share of all occupations in construction. Figure III-8 examines these statistics.

Figure III-8.
Minorities as a percentage of construction workers in selected occupations in California, 2000



Source: BBC Research and Consulting from 2000 U.S. Census 5% Public Use Micro-sample data. The raw data extract was obtained through the IPUMS program of the MN Population Center: http://usa.ipums.org/usa/.

Most of the differences for minorities, overall, reflect differences in Hispanic Americans' representation in these occupations. There were some notable exceptions, however.

African Americans were a relatively large share of construction laborers (5.4 percent) and a relatively small share of first-line supervisors (3.4 percent). These are statistically significant differences from the overall representation of African Americans in the construction industry as a whole (4.3 percent). Even with the higher representation of African Americans in construction laborer jobs, the share of these jobs going to African Americans still falls short of African Americans' representation in the California workforce.

Asian-Pacific Americans were a relatively small share of construction laborers (2.9 percent), cement masons, concrete finishers and terrazzo workers (1.2 percent), truck drivers (2.0 percent), iron and steel workers (2.0 percent), and first-line supervisors (3.0 percent) compared with the share of all construction workers who were Asian-Pacific Americans (4.0 percent). Each difference noted is statistically significant.

Age, length of time in the construction industry, education and ability to speak English may explain some of the differences in occupational composition. The study team will explore these and other reasons for differences in occupational outcomes for minorities in the Final Report.

Women in construction trades. About 10 percent of workers in the California construction industry in 2000 were women. In occupations most closely related to the highway construction industry, however, few workers were women. As shown in Figure III-9:

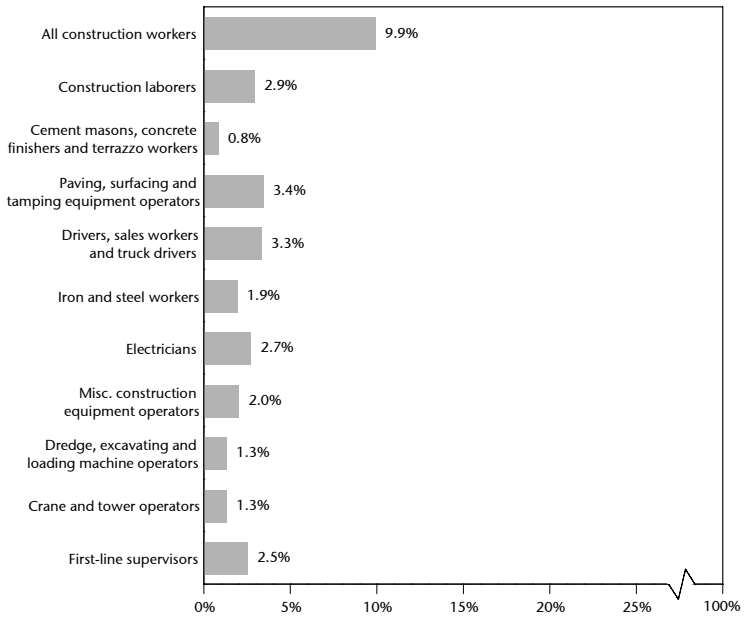
- Among cement masons, concrete finishers and terrazzo workers, fewer than one in 100 workers were women.
- About 1 percent of dredge, excavating and loading machine operators and crane and tower operators were women.
- Two percent of miscellaneous construction equipment operators were women, about the same as women's representation among iron and steel workers.
- Three percent of construction laborers, paving, surfacing and tamping equipment operators, drivers and electricians were women.
- Women were 2.5 percent of first-line supervisors.

Women were a slightly smaller share of workers in construction in 2000 than they were in 1980. The study team will explore possible reasons behind the low representation of women in these construction trades in the Final Report.

Figure III-9.
Women as a percentage of construction workers in selected occupations in California, 2000

Source:

BBC Research and Consulting from 2000 U.S. Census 5% Public Use Micro-sample data. The raw data extract was obtained through the IPUMS program of the MN Population Center: http://usa.ipums.org/usa/.



Relative share of minorities and women in construction who are managers. Figures III-8 and III-9 showed the representation of minorities and women among first-line supervisor positions in the California construction industry. The study team also reviewed employment of minorities and women as managers in the industry, a higher position than first-line supervisors. Construction managers, on average, have more education than first-line supervisors (27 percent have at least a bachelor's degree in California compared with 10 percent of first-line supervisors). Figure III-10 shows the proportion of workers in the construction industry in each group that report a "manager" occupation.

In 2000, 10 percent of non-Hispanic whites working in the California construction industry were managers. A similar percentage of Subcontinent Asian Americans were managers. Nearly 9 percent of

Asian-Pacific Americans were managers (not a substantial difference from the rate for non-Hispanic whites).

In contrast, only 2 percent of Hispanic Americans and 4 percent of African Americans working in construction in 2000 were managers (statistically significant differences from non-Hispanic whites). About 8 percent of Native Americans working in construction were managers.

Relatively fewer women working in construction were managers than men (4.7 percent versus 7.1 percent).

Except for the large number of Native American managers in California, the results described above are consistent with the relative share of construction workers who are managers across the United States. The study team will explore possible causes for these disparities in the Final Report.

Figure III-10.
Percentage of construction workers who work as a manager in California and the U.S., 1980 and 2000

California	1980		2000	
Race/ethnicity				
African American	1.3 %	**	4.1 %	**
Asian-Pacific American	4.0	*	8.9	**
Subcontinent Asian American	3.6		9.9	
Hispanic American	2.0	**	2.3	**
Native American	4.6		7.7	**
Other minority group	6.3		8.3	
Non-Hispanic white	5.6		10.2	
Gender				
Female	6.6	**	4.7	**
Male	4.6		7.1	
All	**4.8 %**		**6.9 %**	

United States	1980		2000	
Race/ethnicity				
African American	1.4 %	**	2.9 %	**
Asian-Pacific American	4.2		7.0	
Subcontinent Asian American	5.1		10.3	**
Hispanic American	1.9	**	2.4	**
Native American	2.2	**	4.2	**
Other minority group	4.7		5.8	**
Non-Hispanic white	4.6		7.1	
Gender				
Female	5.1	**	3.9	**
Male	4.1		6.2	
All	**4.2 %**		**6.0 %**	

Note: *, ** Denote that the difference in proportions between the minority and non-Hispanic white groups (or female and male gender groups) is statistically significant at the 90% and 95% confidence levels, respectively.

Source: BBC Research and Consulting from 1980 and 2000 U.S. Census 5% Public Use Micro-sample data. The raw data extract was obtained through the IPUMS program of the MN Population Center: http://usa.ipums.org/usa/.

Business Ownership

Many studies have explored differences in rates of business ownership between minorities and non-minorities in the United States. Though self-employment rates have increased for minorities and women, studies by Waldinger and Aldrich (1990), Fairlie and Meyer (1996), and Fairlie and Robb (2006) indicate that different opportunities for entrepreneurship exist based on gender, ethnicity and race.[25] One study found that the explanatory power of race and ethnicity in self-employment is almost greater in the presence of other factors that also affect self-employment.[26]

[25] See Waldinger, Roger and Howard E. Aldrich. 1990. *Ethnicity and Entrepreneurship.* Annual Review of Sociology. 111-135.; Fairlie, Robert W. and Bruce D. Meyer. 1996. *Ethnic and Racial Self-Employment Differences and Possible Explanations.* The Journal of Human Resources, Volume 31, Issue 4, 757-793.; Fairlie, Robert W. and Alicia M. Robb. 2006. *Why are Black-Owned Businesses Less Successful than White-Owned Businesses? The Role of Families, Inheritances, and Business Human Capital.* Forthcoming Journal of Labor Economics.; and Fairlie, Robert W. and Alicia M. Robb. 2006. *Race, Families and Business Success: A Comparison of African-American-, Asian-, and White-Owned Businesses.* Russell Sage Foundation.

[26] Fairlie, Robert W. and Bruce D. Meyer. 1996. *Ethnic and Racial Self-Employment Differences and Possible Explanations.* The Journal of Human Resources, Volume 31, Issue 4, 757-793.

Disparities in the rates of business ownership have been one type of evidence used by courts in finding the Federal DBE Program to be valid. Any disparities in business ownership rates may also be important when considering step 2 adjustments in the annual DBE goal. For example, research developed for the Illinois Department of Transportation considered disparities in business ownership rates as a factor in adjusting the base figure for the IDOT annual DBE goal.[27]

California construction industry. The 5% Public Use Micro-sample Data from the U.S. Census of Population can be utilized to study rates of self-employment in California.

Business ownership rates in 2000. Figure III-11 on the following page shows the percentage of different groups working in the construction industry that were self-employed in 2000 and in 1980.

In 2000, 26 percent of non-Hispanic whites working in the construction industry in California were self-employed (in incorporated or unincorporated businesses), about the same as the rate for the United States for that year. The rate of business ownership among Asian-Pacific Americans working in the California construction industry was similar to non-Hispanic whites.

Rates of business ownership among other minority groups working in the construction industry were lower than non-Hispanic whites in 2000:

- African Americans and Hispanic Americans working in the California construction industry owned businesses at one-half the rate of non-Hispanic whites. These differences are statistically significant at the 95 percent confidence level.
- About 15 percent of Subcontinent Asian Americans, working in construction in California, owned their own businesses in 2000. This difference is statistically significant.
- The rate of self-employment for Native Americans working in the construction industry in California, 22 percent, is relatively close to the rate of self-employment for non-Hispanic whites.

In 2000, 15 percent of women working in the California construction industry were self-employed, substantially lower than the rate for men (21 percent). This difference is statistically significant.

In sum, there were statistically significant disparities in the rates of business ownership in 2000 among people working in construction in California for African Americans, Hispanic Americans, Subcontinent Asian Americans and Native Americans compared to non-Hispanic whites. For each of these groups except Native Americans, the differences in self-employment rates compared with non-Hispanic whites were substantial. Women working in construction in 2000 had substantially lower rates of business ownership than men, and the difference is statistically significant. (Note that only 15 percent of people who owned construction businesses had at least a bachelor's degree.)

The patterns found for business ownership for these race/ethnic and gender groups in the California construction industry in 2000 are similar to those for construction in the United States as a whole. The only notable exception was business ownership rates for Asian-Pacific Americans, which were considerably higher in the California industry than the United States.

[27] National Economic Research Associates, Inc. 2004. *Disadvantaged Business Enterprise Availability Study*. Prepared for the Illinois Department of Transportation.

Figure III-11.
Percentage of self-employed workers in the construction industry in California and the U.S., 1980 and 2000

California	1980		2000		United States	1980		2000	
Race/ethnicity					**Race/ethnicity**				
African American	11.7 %	**	13.1 %	**	African American	9.0 %	**	15.7 %	**
Asian-Pacific American	14.9	**	25.6		Asian-Pacific American	11.2	**	21.4	**
Subcontinent Asian American	3.6		15.4	**	Subcontinent Asian American	5.9	**	19.6	**
Hispanic American	9.7	**	11.8	**	Hispanic American	10.5	**	12.6	**
Native American	13.9	**	21.6	**	Native American	9.5	**	19.0	**
Other minority group	22.2		25.4		Other minority group	14.8	*	23.7	
Non-Hispanic white	21.4		26.0		Non-Hispanic white	19.1		25.2	
Gender					**Gender**				
Female	10.0	**	14.6	**	Female	9.5	**	17.1	**
Male	20.0		20.7		Male	18.5		22.9	
All individuals	**18.9 %**		**20.1 %**		**All individuals**	**17.7 %**		**22.3 %**	

Note: *, ** Denote that the difference in proportions between the minority and non-Hispanic white groups (or female and male gender groups) is statistically significant at the 90% and 95% confidence levels, respectively.

Source: BBC Research and Consulting from 1980 and 2000 U.S. Census 5% Public Use Micro-sample data. The raw data extract was obtained through the IPUMS program of the MN Population Center: http://usa.ipums.org/usa/.

Changes in business ownership rates in California since 1980. In 1980, 21 percent of non-Hispanic whites working in the construction industry in California were self-employed. The rate of self-employment in this group increased from 21 percent to reach 26 percent in 2000. Increases were also found for:

- Asian-Pacific Americans, which showed a more dramatic increase in self-employment in construction since 1980 (15 percent in 1980 and 26 percent in 2000);
- Native Americans, which increased from 14 percent self-employment rate in 1980 to 22 percent in 2000); and
- Subcontinent Asian Americans, which may have increased from 4 percent in 1980 to 15 percent in 2000 (note that statistics for 1980 for Subcontinent Asian Americans are based on only 56 responses in the 1980 Census of Population).

This growth in rates of business ownership is not evident for African Americans and Hispanics:

- Although business ownership rates in construction increased since 1980 for African Americans for the nation as a whole, there was little change in the rate for African Americans working in the California construction industry.
- The rate of business ownership increased among Hispanic Americans working in construction in California by two percentage points, about the same as the United States.

The differences in business ownership rates between men and women working in construction in California narrowed between 1980 and 2000. Although the rate of self-employment increased by only one percentage point for men over this time frame, the rate for women increased by 5 percentage points (still remaining below the rate for men).

California engineering industry. The study team also compared self-employment rates among groups for the California engineering industry.

Business ownership rates in 2000. Among non-Hispanic whites working in the California engineering industry in 2000, 19 percent owned their own businesses. Except for Native Americans, minorities working in the industry in 2000 had substantially lower rates of self-employment:

- Only 10 percent of Hispanics working in the engineering industry in California were self-employed.
- Only 11 percent of Asian-Pacific Americans owned their own engineering businesses.
- About 12 percent of African Americans in the engineering industry owned businesses.
- About 14 percent of Subcontinent Asian Americans owned their own business (not a statistically significant difference due to relatively small sample size for Subcontinent Asians working in engineering in California).

There was little difference in rates of business ownership between Native Americans and non-Hispanic whites in 2000, as shown in Figure III-12 on the following page. In California, men were about twice as likely as women working in the engineering industry to be self-employed.

Except for Native Americans, each minority group had higher rates of business ownership in California than found for the nation. Non-Hispanic whites working in the engineering industry also had a higher rate of self-employment in California.

The study team also examined business ownership rates among civil, environmental and geological engineers in California. Results are not presented here due to relatively small sample sizes. In general, disparities in rates of business ownership mirrored those for the industry as a whole.

Changes in business ownership rates in California since 1980. Business ownership rates in the engineering industry increased markedly from 1980 to 2000 for African Americans, Native Americans and women. The overall rate of engineering business ownership fell in California over this period.

Figure III-12.
Percentage of self-employed workers in the engineering industry in California and the U.S., 1980 and 2000

California	1980		2000		United States	1980		2000	
Race/ethnicity					**Race/ethnicity**				
African American	7.8 %	**	12.2 %	**	African American	5.0 %	**	6.4 %	**
Asian-Pacific American	11.1	**	10.7	**	Asian-Pacific American	8.2	**	8.7	**
Subcontinent Asian American	14.6		13.7		Subcontinent Asian American	6.0	**	6.2	**
Hispanic American	8.7	**	10.0	**	Hispanic American	8.7	**	9.5	**
Native American	9.5		20.3		Native American	9.5		11.6	*
Other minority group	10.0		23.0		Other minority group	7.1		11.8	
Non-Hispanic white	20.4		19.1		Non-Hispanic white	15.4		14.7	
Gender					**Gender**				
Female	6.5	**	9.7	**	Female	4.2	**	7.8	**
Male	22.4		19.3		Male	17.6		15.8	
All individuals	**18.4 %**		**16.6 %**		**All individuals**	**14.5 %**		**13.6 %**	

Note: *, ** Denote that the difference in proportions between the minority and non-Hispanic white groups (or female and male gender groups) is statistically significant at the 90% and 95% confidence levels, respectively.

Source: BBC Research and Consulting from 1980 and 2000 U.S. Census 5% Public Use Micro-sample data. The raw data extract was obtained through the IPUMS program of the MN Population Center: http://usa.ipums.org/usa/.

Potential causes of differences in business ownership rates. Researchers have examined whether there are disparities in business ownership rates after considering factors such as education and age. A number of studies have found that disparities in business ownership still exist in the presence of such factors:

- Several studies have found that access to financial capital is a strong determinant of business ownership. One consistent finding is the positive relationship between startup capital and business formation, expansion and survival.[28] One study found that housing appreciation measured at the MSA-level is a positive determinant of entry into self-employment.[29] However, unexplained differences still exist when controlling for these factors.[30]
- Education has positive effects on the probability of business ownership in most industries. However, findings from multiple studies indicate that minorities are still less likely to own a business than their non-minority counterparts with the same levels of education.[31]
- Intergenerational links contribute to the likelihood of self-employment. One study found that experience working for a self-employed family member increases the likelihood of self employment for minority groups.[32]
- Studies have found that time since immigration, or assimilation to American Society, are important determinants of self-employment. However, unexplained differences in minority-business ownership still exist when controlling for these factors.[33]

In the Final Report, the study team will develop statistical models to explore whether factors such as age and education can explain the differences in business ownership rates found for the construction and engineering industries in California. These analyses will draw upon past business ownership research conducted for the nation.

Homeownership and Mortgage Lending

One of the factors researchers examine when studying business formation and success is access to capital. Discrimination in capital markets can prevent minorities and women from acquiring the

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[28] See Lofstrom, Magnus and Chunbei Wang. 2006. *Hispanic Self-Employment: A Dynamic Analysis of Business Ownership.* Working paper, Forschungsinstitut zur Zukunft der Arbeit Institute for the Study of Labor.; and Fairlie, Robert W. and Alicia M. Robb. 2006. *Race, Families and Business Success: A Comparison of African-American-, Asian-, and White-Owned Businesses.* Russell Sage Foundation.

[29] Fairlie, Robert W. and Harry A. Krashinksy. 2006. *Liquidity Constraints, Household Wealth and Entrepreneurship Revisited.*

[30] Lofstrom, Magnus and Chunbei Wang. 2006. *Hispanic Self-Employment: A Dynamic Analysis of Business Ownership.* Working paper, Forschungsinstitut zur Zukunft der Arbeit Institute for the Study of Labor.

[31] See Fairlie, Robert W. and Bruce D. Meyer. 1996. *Ethnic and Racial Self-Employment Differences and Possible Explanations.* The Journal of Human Resources, Volume 31, Issue 4, 757-793; and Butler, John Sibley and Cedric Herring. 1991. *Ethnicity and Entrepreneurship in America: Toward an Explanation of Racial and Ethnic Group Variations in Self-Employment.* Sociological Perspectives. 79-94.

[32] See Fairlie, Robert W. and Alicia M. Robb. 2006. *Race, Families and Business Success: A Comparison of African-American-, Asian-, and White-Owned Businesses.* Russell Sage Foundation; and Fairlie, Robert W. and Alicia M. Robb. 2006. *Why are Black-Owned Businesses Less Successful than White-Owned Businesses? The Role of Families, Inheritances, and Business Human Capital.* Forthcoming Journal of Labor Economics.

[33] See Fairlie, Robert W. and Bruce D. Meyer. 1996. *Ethnic and Racial Self-Employment Differences and Possible Explanations.* The Journal of Human Resources, Volume 31, Issue 4, 757-793; and Butler, John Sibley and Cedric Herring. 1991. *Ethnicity and Entrepreneurship in America: Toward an Explanation of Racial and Ethnic Group Variations in Self-Employment.* Sociological Perspectives. 79-94.

capital necessary to start or expand a business.[34] BBC begins by studying homeownership and mortgage lending, as home equity is an important source of capital to start and expand businesses. The final portion of Section III examines access to business loans.

Homeownership. Wealth created through homeownership can be an important source of capital to start or expand a business. Any barriers to homeownership and home equity growth for minorities or women can affect business opportunities for these groups. Similarly, any barriers to accessing the equity in a home through home mortgages can also affect the capital available for new or expanding businesses. In sum:

- A home is a tangible asset that provides borrowing power;[35]
- Wealth that accrues from housing equity and tax savings from home ownership contribute to capital formation;[36]
- Mortgage loans have traditionally been the second largest loan type for small businesses behind lines of credit;[37] and
- Homeownership is associated with an estimated 30 percent reduction in predicted probability of loan denial for small businesses.[38]

Home equity as a source of business capital is especially important in California where past home price appreciation has caused home ownership to be a substantial portion of many households' wealth.[39]

The study team first considered homeownership rates in California and home prices before turning to data on the home mortgage market.

Homeownership rates. Homeownership is the first step toward building home equity that can be tapped for other purposes.

Many studies document past discrimination in the housing markets in the United States. For example, the United States has a history of restrictive real estate covenants and property laws affecting the ownership rights of minorities and women.[40] In the past, a woman's participation in home ownership was ancillary to that of her husband and parents.[41]

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[34] For an example, see: Coleman, Susan. *Small Firm Sources of Debt Capital: A Comparison by Gender, Race and Ethnicity.* University of Hartford.

[35] Nevin, Allen. 2006. "Homeownership in California: A CBIA Economic Treatise." *California Building Industry Association.* 2.

[36] Jackman, Mary R. and Robert W. Jackman 1980. "Racial Inequalities in Home Ownership." *Social Forces.* 58. 1221-1234.

[37] Berger, Allen N. and Gregory F. Udell. 1998. "The Economics of Small Business Finance: The Roles of Private Equity and Debt Markets in the Financial Growth Cycle." *Journal of Banking and Finance.* 22.

[38] Cavalluzzo, Ken and John Wolken. 2005. "Small Business Loan Turndowns, Personal Wealth and Discrimination." *Journal of Business.* 78:2153-2178.

[39] Myers, Dowell and Xin Gao. 2004. "Trajectories of Homeownership in California, 1980 to 2000, and 2000 to 2030." *California Housing Futures research program.* Fannie Mae Foundation.

[40] Ladd, Helen F. 1982. "Equal Credit Opportunity: Women and Mortgage Credit." *The American Economic Review.* 72:166-170.

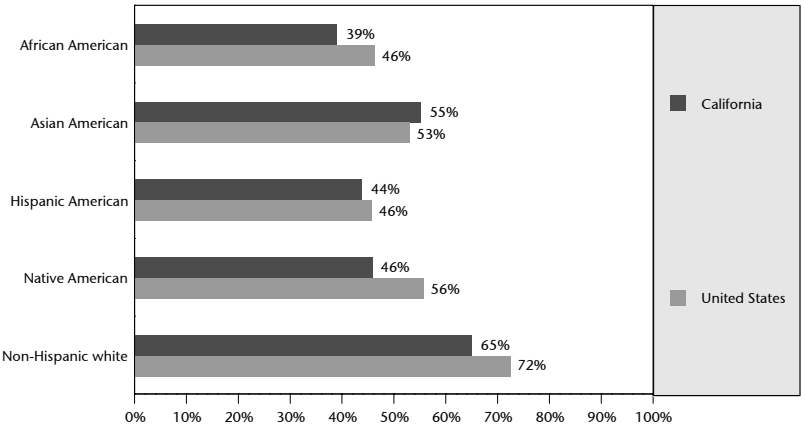
[41] Card, Emily. 1980. "Women, Housing Access, and Mortgage Credit." *Signs.* 5:215-219.

Figure III-13 illustrates disparities in homeownership between minority groups and non-Hispanic whites in California and the nation in 2000. About 39 percent of African American households were homeowners compared with 65 percent of non-Hispanic whites in the state. Homeownership rates were also particularly low for Hispanic Americans and Native Americans in California. Overall rates of homeownership were lower in California than the nation, in part due to the historically high price of homes in the state.[42]

Figure III-13. Homeownership rates, 2000

Source:

U.S. Census Bureau, KnowledgePlex Calculations, an online resource maintained by the Fannie Mae Foundation.



BBC also examined homeownership rates for heads of household who worked in the construction industry and engineering industry. Disparities in homeownership rates found for all California households were also identified for households in which the head of household worked in the construction industry. Differences in homeownership rates also persist for African Americans and Hispanic Americans working in the engineering industry.

Different rates of homeownership in part reflect lower incomes for minorities. This may be self-reinforcing, as low wealth puts individuals at a disadvantage in becoming homeowners, which is an effective path to building wealth. One study found statistically significant results indicating that the probability of homeownership is considerably lower for African Americans than it is for comparable non-Hispanic whites throughout the U.S.[43] A study in Los Angeles found different results. Controls for types of income indicated that probabilities of homeownership for African American households in South-Central Los Angeles and San Bernardino County were identical to white households.[44]

Home values. Homeownership and the value of the home is a direct indicator of capital available to form or expand businesses. For example, using microdata from matched Current Population Surveys (1993-2004), one study found that differences in housing appreciation between metropolitan areas affected entry into self-employment. The study indicated that a 10 percent annual increase in housing equity increases the mean probability of entrepreneurship by approximately 20 percent.[45]

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[42] Quigley, John M. and Steven Raphael. 2004. "Regulation and the High Cost of Housing in California." *University of California, Berkeley.*

[43] Jackman. 1980. "Racial Inequalities in Home Ownership."

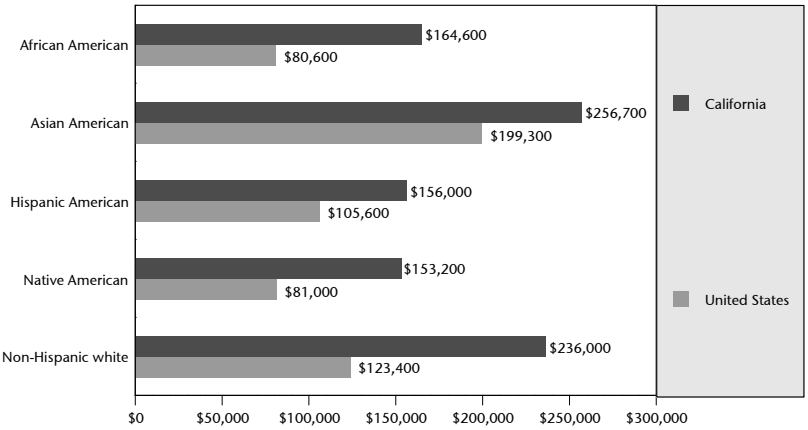
[44] Gabriel, Stuart and Gary Painter. 2001. "Pathways to Homeownership: An Analysis of the Residential Location and Homeownership Choices of Black Households in Los Angeles." *USC Finance & Business Econ.* Working Paper No. 01-22.

[45] Fairlie, Robert W. and Harry A. Krashinky. 2006. "Liquidity Constraints, Household Wealth, and Entrepreneurship Revisited." *IZA Discussion Paper.* No. 2201.

U.S. Bureau of the Census data on home values in 2000 allow comparisons of median home values by race and ethnicity. The median home value of non-Hispanic whites in 2000 was $236,000 in California, substantially above the median value of homes owned by minorities.

Figure III-14.
Median home value, 2000

Source:
U.S. Census Bureau, Census 2000 and BBC Research and Consulting.



Steering by real estate agents. A number of researchers have found that discrimination by real estate agents contributes to residential segregation of minorities.[46] One such practice is "steering" of prospective homebuyers toward particular neighborhoods and away from others because of their race or ethnicity (a practice that has been prohibited by law for many decades). A recent study found such practices in Los Angeles and other cities throughout the country.

Mortgage lending. Minorities may be denied opportunities to own homes, to purchase more expensive homes or to access equity in their homes if they are discriminated against when applying for home mortgages. BBC explored this issue.

The best source of information concerning mortgage lending discrimination is Home Mortgage Disclosure Act (HMDA) data. HMDA data pertain to information about mortgage loan applications for financial institutions, savings banks, credit unions and some mortgage companies.[47] The data contain information about the location, dollar amount, and types of loans made, as well as racial and ethnic information, income, and credit characteristics of all loan applicants. The data are available for home purchases, loan refinances, and home improvement loans.

The study team's analysis uses statistics provided by KnowledgePlex on loan denial rates of high-income borrowers. High-income borrowers include households with 120 percent or more of the U.S. Department of Housing and Urban Development (HUD) area median family income.[48] Conventional loans are loans not insured by a government program. Loan denial rates are calculated

[46] Galster, George and Erin Godfrey. 2005. "Racial Steering by Real Estate Agents in the U.S. in 2000." *Journal of the American Planning Association.* 71:251-268.

[47] Financial institutions are required to report HMDA data if they have assets of more than $32 million, have a branch office in a metropolitan area, and originated at least one home purchase or refinance loan in the reporting calendar year. Mortgage companies are required to report HMDA if they are for-profit institutions, had home purchase loan originations exceeding 10 percent of all loan obligations in the past year, are located in an Metropolitan Statistical Area (or originated five or more home purchase loans in an MSA) and either had more than $10 million in assets or made at least 100 home purchase or refinance loans in the calendar year.

[48] 2005 median family income is $58,000 for the United States and $62,500 for California. Based on 2000 census data on family incomes. Data are updated to 2005 using Census P-60 median family income data, Census American Community Survey data on changes in state median family incomes and local Bureau of Labor Statistics Wage data.

as a share of mortgage loan applications that have either been denied or originated (this excludes terminations of the application process by the potential borrower).

Data on loan denial rates for mortgages in California show higher denial rates for minority than for non-Hispanic white high-income households. Figure III-15 on the following page reports loan denial rates for the state for 2005. Among high-income households applying for mortgages, 28 percent of African American applicants had their applications denied compared with 16 percent of non-Hispanic white households. Loan denial rates were also higher for Native Americans, Hispanic Americans and Asian Americans.

The patterns of loan denial rates by race and ethnicity in California mirror those of the United States as a whole for 2005, although California loan denial rates were higher than national rates for both minorities and non-minorities.

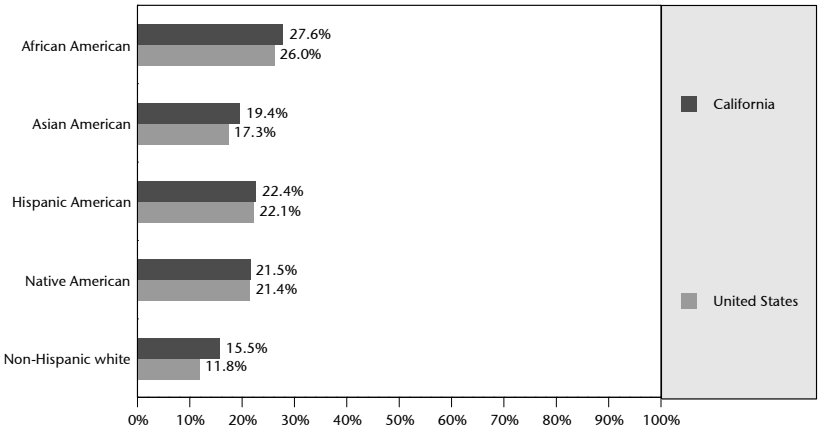
Figure III-15.
Denial rates of conventional purchase loans to high-income households, 2005

Note:

High-income borrowers include households with 120% or more than the HUD area median family income (MFI).

Source:

FFIEC HMDA data 2005 and KnowledgePlex, an online resource maintained by the Fannie Mae Foundation.



A number of national studies have examined disparities in loan denial rates and loan amounts for minorities in the presence of other influences. Examples include the following:

- The Boston Fed Study is one of the most famous studies of mortgage lending discrimination.[49] It was conducted using the most comprehensive set of credit characteristics ever assembled for a study on mortgage discrimination.[50] The study provided persuasive evidence that lenders in the Boston area discriminated against minorities in 1990.[51]
- Using the Federal Reserve Board's 1983 Survey of Consumer Finances and the 1980 Census of Population and Housing data, logit statistical analysis revealed that minority households were one-third as likely to receive conventional loans as non-Hispanic white households after taking into account financial and demographic controls.[52]

[49] Munnell, Alicia H., Geoffrey Tootell, Lynn Browne and James McEneaney. 1996. "Mortgage Lending in Boston: Interpreting HMDA Data." The American Economic Review. 86: 25-53.

[50] Ladd, Helen F. 1998. "Evidence on Discrimination in Mortgage Lending." The Journal of Economic Perspectives. 12:41-62.

[51] Yinger, John. 1995. Closed Doors, Opportunities Lost: The Continuing Costs of Housing Discrimination. New York: Russell Sage Foundation, 71.

[52] Canner, Glenn B., Stuart A. Gabriel and J. Michael Woolley. 1991. "Race, Default Risk and Mortgage Lending: A Study of the FHA and Conventional Loan Markets." Southern Economic Journal. 58:249-262.

- Findings from a Midwest study indicate a significant relationship between race and both the number and amount of mortgage loans. Data matched on socioeconomic characteristics revealed that African American borrowers across 13 census tracts received significantly less of both compared to their white counterparts.[53]

On the other hand, other studies have found that differences in preferences for FHA versus conventional loans among racial and ethnic groups may partly explain disparities found in conventional loan approvals between minorities and non-minorities.[54] Several studies have found that minority borrowers are far more likely to receive FHA loans than comparable non-Hispanic white borrowers at all income and wealth levels. FHA loans are insured by the government thus protecting the lender, but the borrower can be hurt by higher costs. [55]

Relevant studies are more limited in California.

- Home Mortgage Disclosure Act (HMDA) data revealed disparities in prime and subprime lending for African American, Hispanic American and Native American applicants. Differences extended across all Metropolitan Statistical Areas.[56]

- An older study using HMDA data and a stepwise regression model accounting for socioeconomic status revealed that measures of ethnicity contribute little explanation to mortgage lending in Sacramento.[57]

- A recent paired testing approach revealed adverse treatment of African Americans and Hispanics in Los Angeles. In some cases, the overall pattern of treatment observed did not differ statistically from equal treatment. Multivariate analysis found almost no evidence of systemic variation in the treatment of African American testers in Los Angeles other than encouragement for FHA loans.[58]

Higher fees and interest rates. Denial of loans is only one way that minorities could be discriminated against in the home mortgage market; mortgage-lending discrimination can also reveal itself through high fees and interest rates. The housing market provides a unique atmosphere for this type of discrimination through fees associated with various loan types.

One of the fastest growing segments of the home mortgage industry is subprime lending. From 1994 through 2003, subprime mortgage activity grew by 25 percent per year and accounted for $330 billion of U.S. mortgages in 2003, up from $35 billion a decade earlier. Subprime loans are marketed and sold to customers with blemished or limited credit histories that would typically not qualify for prime loans.

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[53] Leahy, Peter J. 1985. "Are Racial Factors Important for the Allocation of Mortgage Money?: A Quasi-Experimental Approach to an Aspect of Discrimination." American Journal of Economics and Sociology. 44:185-196.

[54] Canner. 1991. "Race, Default Risk and Mortgage Lending: A Study of the FHA and Conventional Loan Markets."

[55] Yinger. 1995. *Closed Doors, Opportunities Lost: The Continuing Costs of Housing Discrimination.* 80.

[56] Gee, Peter. 2004. *The Price of Credit: Prime and Subprime Lending in California 2004.* The Greenlining Institute.

[57] Dingemans, Dennis. 1979. "Redlining and Mortgage Lending in Sacramento." *Annals of the Association of American Geographers.* 69:225-239.

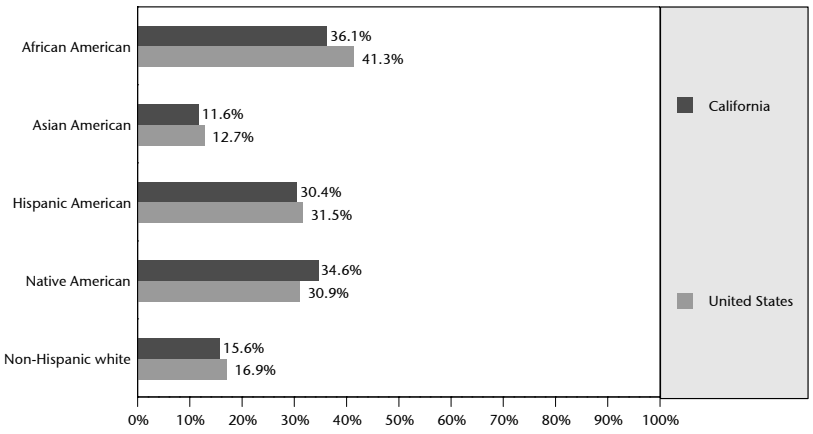
[58] Ross, Stephen, Margery Austin Turner, Erin Godfrey and Robin R. Smith. 2005. "Mortgage Lending in Chicago and Los Angeles: A Paired Testing Study of the Pre-Application Process." *University of Connecticut Department of Economics*. Working Paper Series.

Minorities are more likely to receive a subprime loan, which charge higher interest fees than conventional loans. Financial institutions have been accused of taking advantage of minorities by charging unnecessarily high rates and imposing costs that endanger home ownership. One study found many users of the subprime market are qualified for prime loans.[59]

In California, African American, Native American and Hispanic American borrowers are much more likely to have a subprime loan than non-Hispanic whites. For example, 36 percent of the conventional refinancing loans received by African Americans were from subprime lenders compared with only 16 percent of refinancing loans received by non-Hispanic whites. On the other hand, Asian Americans are less likely than non-Hispanic whites to obtain a mortgage from the subprime market.

Figure III-16.
Percent of conventional refinancing loans from subprime lenders, 2004

Source:
FFIEC HMDA data 2004 and KnowledgePlex, an online resource maintained by the Fannie Mae Foundation.



Historically, differences in types of loans awarded to minorities have been attributed to steering by real estate agents, who serve as an information filter between buyers and sellers.[60] Some studies claim that real estate brokers provide different levels of assistance and different information on loans to minorities and non-minorities.[61] This "steering" can shape the perceived availability of loans to minority borrowers.

Home value appraisal is another means of discrimination in mortgage lending. Differences in appraisal values can change the loan-to-value ratio, an indicator of risk for lending institutions. Findings suggest that minorities and women have been subject to the under-appraisal of home values. One study suggests that appraisers lower appraisal values for minorities.[62] Another study found that minorities have higher loan-to-value ratios.[63]

Other potential forms of discrimination by lenders are more difficult to analyze and document.[64] Areas include outreach and application procedures (i.e. helping non-minority applications look stronger), loan terms determined by the lender (interest rates, maturity, loan-to-value ratio and loan

[59] Freddie Mac. 1996, September. "Automated Underwriting: Making Mortgage Lending Simpler and Fairer for America's Families." *Freddie Mac.* (accessed February 5, 2007).

[60] Kantor, Amy C. and John D. Nystuen. 1982. "De Facto Redlining a Geographic View." *Economic Geography.* 4:309-328.

[61] Yinger. 1995. *Closed Doors, Opportunities Lost: The Continuing Costs of Housing Discrimination.* 78–79.

[62] Yinger. 1995. *Closed Doors, Opportunities Lost: The Continuing Costs of Housing Discrimination.* 82.

[63] Tootell, Geoffrey M. B. 1996. "Redlining in Boston: Do Mortgage Lenders Discriminate Against Neighborhoods?" *The Quarterly Journal of Economics.* 111:1049-1079.

[64] Yinger. 1995. *Closed Doors, Opportunities Lost: The Continuing Costs of Housing Discrimination.* 78-81.

types), underwriting standards that may disproportionately affect minorities and women, and default and foreclosure options.

Anecdotal evidence suggests that African American home seekers generally must expend more time, effort and resources than non-Hispanic whites for the same end.[65] Minorities and women may also believe they are required to produce greater levels of equity and hard collateral in order to secure debt than their non-minority male counterparts and have fewer options for investment capital.[66]

Redlining. Redlining is the term for mortgage lending discrimination to geographic areas associated with high lender risk. These areas are often racially determined, such as African American and mixed race neighborhoods.[67] This practice can perpetuate problems in already poor neighborhoods.[68]

For example, the City of East Palo Alto sued a California lender for redlining and having loan practices that discriminated against people in low income or minority communities. Evidence included loan officers telling applicants that the bank simply did not lend in East Palo Alto or in specific minority neighborhoods.[69] The bank provided cash and a revolving loan fund in order to settle the lawsuit.

Most quantitative studies have failed to find strong evidence in support of geographic dimensions of lender decisions. Studies in Columbus, Ohio; Boston, Massachusetts; and Houston, Texas found that the racial differences in loan denial had little to do with racial composition of the neighborhood, but rather the individual characteristics of the borrower.[70] Some studies found race of the applicant to be a factor in loan denials, not the racial makeup of the neighborhood.

Studies of redlining have primarily focused on the geographic aspect of lender decisions; however, redlining can also include the practice of restricting credit flows to minority neighborhoods through procedures that are not observable in actual loan decisions. Examples include branch placement, advertising and other pre-application procedures.[71] These practices can deter minorities from starting businesses. Locations of financial institutions are important to small business start up because local

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[65] Bullard, Robert D. 1990. "Housing Barriers: Trends in the Nation's Fourth-Largest City." *Journal of Black Studies.* 21:4-14.

[66] Darryl E. Greene & Associates, P.C., and Triaxial Management Services, Inc., a Joint Venture. 1994. *DBE/MBE/WBE Predicate Study: Preliminary.* Los Angeles County Metropolitan Transportation Authority.

[67] Holloway, Steven R. 1998. "Exploring the Neighborhood Contingency of Race Discrimination in Mortgage Lending in Columbus, Ohio." *Annals of the Association of American Geographers.* 88:252-276.

[68] Ladd, Helen F. 1998. "Evidence on Discrimination in Mortgage Lending." *The Journal of Economic Perspectives.* 12:41-62.

[69] "California bank pays $206,000 and establishes $7 million credit line for city to settle redlining suit." *National Fair Housing Advocate Online.* http://www.fairhousing.com/index.cfm?method=page.display&pagename=advocate_october02_page5 (accessed February 8,2007).

[70] See Holloway.1998. "Exploring the Neighborhood Contingency of Race Discrimination in Mortgage Lending in Columbus, Ohio."; Tootell. 1996. "Redlining in Boston: Do Mortgage Lenders Discriminate Against Neighborhoods?"; and Holmes, Andrew and Paul Horvitz. 1994. "Mortgage Redlining: Race, Risk, and Demand." *The Journal of Finance.* 49:81-99.

[71] Yinger, John. 1995. "Closed Doors, Opportunities Lost: The Continuing Costs of Housing Discrimination." Russell Sage Foundation. New York. 78-79.

banking sectors often finance local business. [72] Redlining practices would deny this capital resource to minorities.

Gender discrimination in mortgage lending. Relatively little information is available on sex-based discrimination in mortgage lending markets. Historically, lending practices overtly discriminated against women by requiring information on marital and childbearing status. Risk associated with women of childbearing age and unmarried women resulted in "income discounting," limiting the availability of loans to women.[73]

The Equal Credit Opportunity Act (ECOA) in 1973 suspended these discriminatory lending practices. A study in California explored discrimination against married and single women in 16 metropolitan areas from 1977 to 1978. Regression analysis revealed little evidence of sex discrimination in California. Barriers have continued after 1973, however. For example, there is some evidence that lenders under-appraise property for female borrowers.[74]

Access to Business Capital

Barriers to capital markets can have significant outcomes for small business formation and expansion. "Discrimination in obtaining loans due to race and gender," was identified as an issue for businesses during Caltrans public hearings held in spring 2006.[75] In addition, several studies have found evidence that start-up capital is important for business profits, longevity and other outcomes.[76]

- The amount of start-up capital is positively associated with small business sales and other outcomes.[77]
- Limited access to capital has limited the size of African American-owned businesses.[78]
- Weak financial capital was identified as a significant reason that more African American-owned firms than non-Hispanic white-owned firms closed over a four-year period.[79]

Bank loans are one of the largest sources of debt capital for small businesses.[80] Discrimination in the application and approval processes of these loans and other credit resources could be detrimental to the success of minority- and women-owned businesses.

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[72] Holloway. 1998. "Exploring the Neighborhood Contingency of Race Discrimination in Mortgage Lending in Columbus, Ohio."

[73] Card. 1980. "Women, Housing Access, and Mortgage Credit."

[74] Ladd, Helen F. 1982. "Equal Credit Opportunity: Women and Mortgage Credit." *The American Economic Review*. 72:166-170.

[75] Caltrans Public Hearing Testimony and Related Documents. Examined and summarized by GCAP Services.

[76] For examples see Fairlie. 2006. "Liquidity Constraints, Household Wealth, and Entrepreneurship Revisited;" and Grown, Caren and Timothy Bates. 1991. "Commercial Bank Lending Practices and the Development of Black-Owned Construction Companies." Center for Economic Studies, U.S. Bureau of the Census.

[77] See Fairlie, Robert W. and Harry A. Krashinsky. 2006. "Liquidity Constraints, Household Wealth, and Entrepreneurship Revisited"; and Grown. 1991. "Commercial Bank Lending Practices and the Development of Black-Owned Construction Companies."

[78] Grown. 1991. "Commercial Bank Lending Practices and the Development of Black-Owned Construction Companies."

[79] Grown. 1991. "Commercial Bank Lending Practices and the Development of Black-Owned Construction Companies."

Previous studies have addressed race, ethnic and gender discrimination in capital markets by evaluating:

- Loan denial rates;
- Loan values;
- Interest rates;
- Individual assumptions that loan applications will be rejected;
- Sources of capital; and
- The relationship between start-up capital and business survival.

To examine these questions, the study team analyzed data from the Federal Reserve Board's 1998 Survey of Small Business Finances (SSBF) conducted by the Board of Governors. It is the most comprehensive national source of credit characteristics of firms with fewer than 500 employees. Sample weights are applied to provide representative estimates.[81] The survey contains information on loan denial and interest rates, as well as anecdotal information from firms. The sample contains records for 3,521 firms nationally.

The SSBF records the geographic location of the firm by census division, not city or state. The Pacific Census Division contains California.[82]

Loan denial rates. Figure III-17 shows loan denial rates from the 1998 SSBF for the Pacific region. African American-owned businesses experienced higher rates of denial (59 percent) than all other groups in the Pacific region, consistent with nationwide results. Hispanic American-owned firms had a 46 percent rate of loan denials, nearly twice as high as non-Hispanic whites. Asian American-owned firms also had relatively high rates of loan denial.

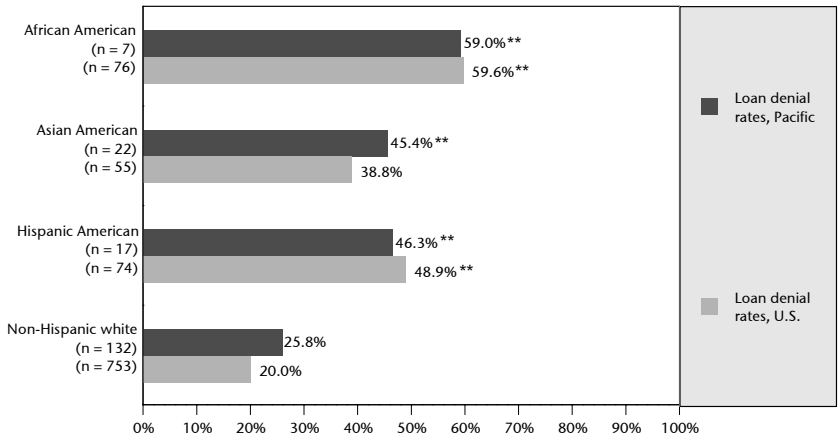
Figure III-17. Business loan denial rates, 1998

Note:

** Denotes that the difference in proportions from non-Hispanic whites are statistically significant at the 95% confidence level.

Source:

BBC Research and Consulting from 1998 Survey of Small Business Finances.



[80] Data from the 1998 SSBF indicates that 70 percent of loans to small business are from commercial banks. This result is present across all gender, race and ethnic groups with the exception of African Americans, whose rate of lending from commercial banks is even greater than other minorities. See Blanchard, Lloyd, Bo Zhao and John Yinger. 2005. "Do Credit Market Barriers Exist for Minority and Woman Entrepreneurs." *Center for Policy Research, Syracuse University.*

[81] Ethnicity and race were analyzed using the following methodology: A non-Hispanic white firm is a firm that is not Hispanic and not minority; an African American firm is black/African American and not Hispanic; Hispanic American is all firms that identify as Hispanic; and Asian-Pacific American is either Asian, Native American or Native Hawaiian and not Hispanic. Firms that claimed "sometimes approved/sometimes denied" were given half weights to the loan denial rate. Weighted rates and means were computed. The sample size is unweighted.

[82] The Pacific Census Division includes Alaska, California, Hawaii, Oregon and Washington.

A number of studies have developed regression models to isolate the effects of race and ethnicity from other factors that affect loan approvals. Findings from these studies include:

- Commercial banks are less likely to loan to African American-owned firms than non-Hispanic white-owned firms after controlling for other factors.[83]
- African American, Hispanic American and Asian American men are more likely to be denied for a loan than non-Hispanic white men. However, African American borrowers are more likely to apply for a loan.[84]
- There are substantial unexplained differences in credit applications, loan denials and interest rates between non-Hispanic white- and African American-owned firms. Competitiveness of lender markets helps to explain these disparities.[85]
- The probability of loan denial decreases with greater personal wealth. However, controlling for personal wealth does not resolve the large differences in denial rates across African American-, Hispanic American-, Asian American-, and non-Hispanic white-owned firms. Specifically, information on personal wealth explained some differences for Hispanic- and Asian American-owned firms compared to non-Hispanic whites, but almost none for African Americans.[86]
- Loan denial rates are significantly higher for African American-owned firms than non-Hispanic white-owned firms in the presence of several other factors such as creditworthiness and other characteristics. This result is largely insensitive to econometric specification. Consistent evidence on loan denial rates and other indicators of discrimination in credit markets was not found for other minorities and women.[87]

Using data from the 1998 SSBF and controlling for other variables, women are no less likely to apply for or be approved for loans.[88]

Loan values. Beyond loan denial rates, the study team considered the loan values for firms receiving loans. Results from the 1998 SSBF for the most recent loan values awarded by ethnicity, race and gender are given in Figure III-18.

In the Pacific, the average loan amount for non-Hispanic whites was $227,691. Minority-owned firms had lower loan amounts:

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[83] Cavalluzzo, Ken, Linda Cavalluzzo and John Wolken. 2000. "Competition, Small Business Financing and Discrimination: Evidence from a New Survey." *FEDS Working Paper No. 99-25*

[84] Coleman, Susan. 2002. "Characteristics and Borrowing Behavior of Small, Women-owned Firms: Evidence from the 1998 National Survey of Small Business Finances." *The Journal of Business and Entrepreneurship.* 151-166.

[85] See Cavalluzzo, 2000. "Competition, Small Business Financing and Discrimination: Evidence from a New Survey."

[86] Cavalluzzo, Ken and John Wolken. 2002. "Small Business Turndowns, Personal Wealth and Discrimination." *FEDS Working Paper No. 2002-35.*

[87] Blanchflower, David G., Phillip B. Levine and David J. Zimmerman. 2003. "Discrimination in the Small Business Credit Market." *The Review of Economics and Statistics.* 85:930-943.

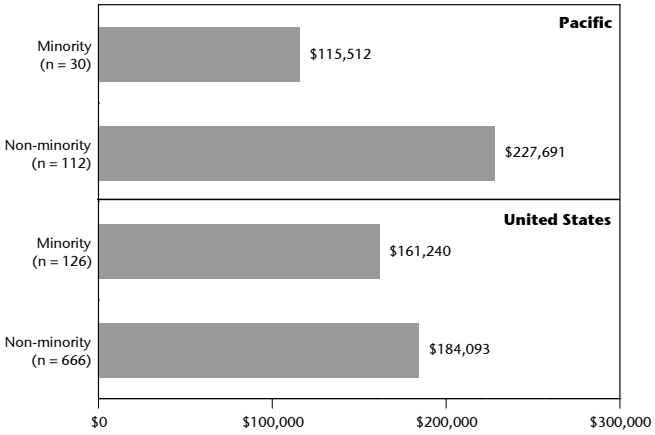
[88] Coleman. 2002. "Characteristics and Borrowing Behavior of Small, Women-owned Firms: Evidence from the 1998 National Survey of Small Business Finances."

- Minority-owned firms received loan amounts that averaged half of the loan amounts awarded to non-Hispanic white-owned firms.
- A similar trend exists for minority-owned firms on a national level, but the difference is much smaller than in the Pacific region.

The differences for minority firms reflected lower loan amounts requested.

Figure III-18.
Approved business loan values, 1998

Source:
BBC Research and Consulting from 1998 Survey of Small Business Finances.



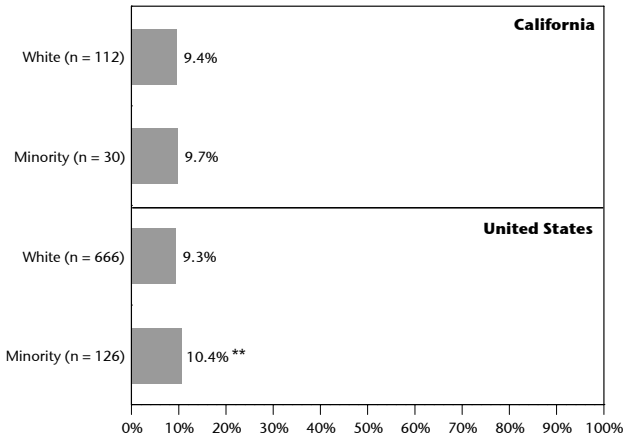
Previous national studies have found that African American-owned firms receive substantially lower loan amounts than their non-Hispanic white counterparts with similar characteristics. Examination of construction companies in the United States revealed that African American-owned firms received smaller loans than firms with otherwise identical traits. This increases the likelihood of firm closure. [89]

Interest rates. Figure III-19 on the following page presents average interest rates on commercial loans from the 1998 SSBF. The mean interest rates for African American-owned firms, Asian-Pacific American-owned firms and Hispanic-owned firms in the Pacific region are similar to the mean interest rate for non-Hispanic whites of 9.4 percent.

Figure III-19.
Mean interest rate for business loans, 1998

Note:
** Denotes that the difference in proportions from non-Hispanic whites are statistically significant at the 95% confidence level.

Source:
BBC Research and Consulting from 1998 Survey of Small Business Finances.



[89] Grown. 1991. "Commercial Bank Lending Practices and the Development of Black-Owned Construction Companies."

The results above are similar to some studies of interest rates charged for commercial loans that controlled for factors such as individual credit history, firm credit history, and Dun and Bradstreet credit scores. [90] Differences were found in some studies:

- Hispanic-owned firms had significantly higher interest rates in places with less credit market competition.[91]
- Among a sample of firms with no past credit problems, African American-owned firms paid significantly higher interest rates on approved loans.[92]

Individual assumptions that loan applications will be rejected. Fear of loan denial is a barrier to capital markets because it prevents small businesses from applying for loans and thus can help explain differences in business outcomes. In addition, it provides insight into minority business owners' perceptions of the small business lending market. Figure III-20 on the following page shows results from the 1998 SSBF on firms that reported needing credit but did not apply because they feared denial. African American-owned firms had higher rates than all other groups in the Pacific region, consistent with national results. Hispanic American-owned firms also had higher rates than non-Hispanic white-owned firms, with larger differences in the Pacific region compared to national rates.

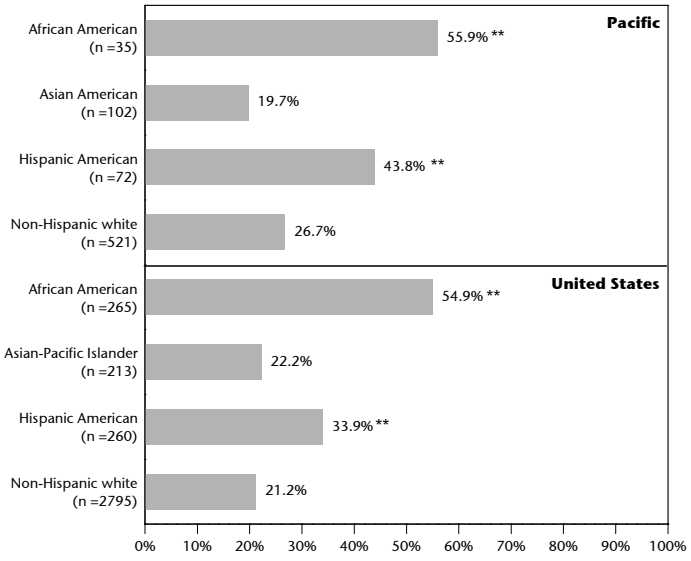
Figure III-20.
Firms that needed loans but did not apply due to fear of denial, 1998

Note:

** Denotes that the difference in proportions from non-Hispanic whites are statistically significant at the 95% confidence level.

Source:

BBC Research and Consulting from 1998 Survey of Small Business Finances.



The body of literature identifies multiple factors that influence the decision to apply for a loan, such as firm size, firm age, owner age and educational attainment. Controlling for these factors can help to determine whether race and ethnicity explain fear of loan denial. Findings indicate:

- African American- and Hispanic American-owners are significantly less likely to apply for loans.[93]
- After controlling for educational attainment, there were no significant differences in loan application rates between non-Hispanic white, African American, Hispanic and Asian American men.[94]

[90] Cavalluzzo. 2000. "Competition, Small Business Financing and Discrimination: Evidence from a New Survey."

[91] Cavalluzzo. 2000. "Competition, Small Business Financing and Discrimination: Evidence from a New Survey."

[92] Blanchflower. 2003. "Discrimination in the Small Business Credit Market."

[93] Cavalluzzo, 2000. "Competition, Small Business Financing and Discrimination: Evidence from a New Survey."

- African American-owned firms are more likely than other firms to report being seriously concerned with credit markets and are less likely to apply for credit in fear of denial.[95]

Comments concerning access to capital from firms interviewed in the 2006 Availability Survey. Near the conclusion of the interviews with business owners and managers in the transportation construction and engineering industry, the 2006 Availability Survey included the following open-ended question:

Finally, we are giving business owners and managers an opportunity to offer general insights on your industry, including how difficult it is to start or expand your business and to [bid / propose] on and win work. As you are thinking, be sure to consider any issues related to Caltrans and local government projects in California. What thoughts do you have to offer on these topics?

The questions asked were open-ended by design, which affects the number of comments concerning each potential barrier. If the study team had specifically asked about each potential barrier, more firms would have identified the issue are as a barrier for their firm. The strength of this methodology is that respondents identified areas of problems unprompted by the interviewers. It shows the degree to which certain barriers were "top of mind" for business owners and managers. BBC coded multiple responses.[96]

Some transportation construction firms mentioned access to capital as a difficulty in starting or expanding their businesses or in working with Caltrans. Unprompted, about 1 percent of firms brought up this issue. Four percent of African American-owned firms responding to the survey mentioned access to capital as a barrier, a greater rate than other firms.

Very few transportation engineering firms identified access to capital as a barrier in the 2006 Availability Survey, although 2 percent of African American-owned businesses mentioned this issue.

Other factors affecting capital markets. Strength in the ethnic banking sector influences credit accessibility in ethnic communities in Los Angeles. A strong Asian American bank sector helped Asian American communities transition to successful business environments, and a lack of strong banking sectors in African American communities could hinder development of African American businesses. [97]

Avenues for further research. The BBC study team will further analyze 1998 SSBF data as well as recently released 2003 SSBF data to explore differences in outcomes for minorities in access to credit after controlling for factors such as measures of creditworthiness.

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[94] Coleman, Susan. 2004. "Access to Debt Capital for Small Women- and Minority-Owned Firms: Does Educational Attainment Have an Impact?" *Journal of Developmental Entrepreneurship*. 9:127-144.

[95] Blanchflower et al., 2003. *Discrimination in the Small Business Credit Market.*

[96] For example, if a firm owner responded to the first question by indicating that slow payment and contract specifications were barriers, BBC tracked both responses. If the firm owner answered the second question with further elaboration on slow payment, and then added a comment about difficulty finding information about contract opportunities, the information on bidding comment was added to the combined responses for that firm.

[97] Dymski, Gary and Lisa Mohanty. 1999. "Credit and Banking Structure: Asian and African-American Experience in Los Angeles." *The American Economic Review.* 89:362-366.

Bonding

Although little quantitative information exists regarding MBEs and WBEs and access to surety bonds for public construction projects, there is anecdotal evidence that suggests such problems persist.[98] For example, in spring 2006 Caltrans public hearings, one concern among minority, women and small business owners was high insurance and bonding requirements.[99]

Access to bonding and bonding requirements were brought up by a few transportation construction or engineering industry firms when discussing barriers to entry and business success in the 2006 Availability Survey. Two percent of African American-owned firms interviewed mentioned bonding as a barrier, which was more than other firms. Most comments related to bonding were focused on general difficulties in obtaining bonds, particularly for small businesses. Some firms specifically cited Caltrans' bonding requirements as a barrier to obtaining work. For example, one respondent stated, "Caltrans' requirements are pretty stringent in regards to bonding." Another said, "I think Caltrans is looking for big projects from big firms. We are a small firm and can do the job but bonding is the biggest issue."

The study team will be conducting further research into this issue in the Final Report.

Additional Analysis in the Final Report

The BBC study team will be collecting and analyzing additional qualitative and quantitative information concerning any barriers to entry into the transportation construction and engineering industry in California. Study team members will conduct in-depth interviews with minority-, women- and majority-owned firms in this industry as well as trade associations active in the industry. Caltrans plans to hold public hearings in spring 2007 which may solicit testimony that shed more light on these issues.

BBC will also be conducting additional quantitative analyses, including further exploration of whether neutral factors can explain any disparities suggesting barriers to entry identified in the Interim Report.

The results of these additional analyses will be included in the Final Report for the Availability and Disparity Study.

[98] Enchautegui, Maria E. et al. 1997. "Do Minority-Owned Businesses Get a Fair Share of Government Contracts?" *The Urban Institute:* 1-117, p. 56.

[99] Caltrans Public Hearing Testimony and Related Documents. Examined and summarized by GCAP Services.

SECTION IV.
Immediate Recommendations

SECTION IV.
Immediate Recommendations

This section offers recommendations concerning future data collection, maintenance and reporting practices. These recommendations are based on discussions with Caltrans staff, the study team's experience collecting and analyzing contract and subcontract data from Caltrans and local agencies, knowledge of bidders list and vendor registration systems of other state departments of transportation, and review of requirements in the Federal DBE Program (49 CFR Part 26).

Data Collection Recommendations for Caltrans Contracts and Grants

The study team makes the following immediate recommendations.

Caltrans should develop a comprehensive bidders list. Caltrans should develop a master database of prime contractors, subcontractors, suppliers, truckers and other firms available to work on state transportation construction and engineering contracts. This bidders list would compile firm-specific information on every prime contractor and subcontractors even if the prime contractor is an unsuccessful bidder.

Caltrans does not have a comprehensive bidders list today because of lack of contractor participation. To address this need, Caltrans should make it a condition of bid that the prime contractor and subcontractors have completed a bidder registration form at time of bid. Such registration can be submitted with the bid. Any subcontractors, including second-tier subcontractors, truckers and suppliers, added after time of bid would also require a completed bidder registration form. Caltrans should require contractors to periodically update the bidder registration information.

In addition to being a required element of the Federal DBE Program (49 CFR Section 26.11 (b)), a comprehensive bidders list will assist Caltrans in setting annual DBE goals in the future, in conducting outreach to prospective contractors and tracking the types of firms receiving work. The database also allows small and emerging subcontractors and suppliers to make themselves known to potential prime contractors.

The Federal DBE Program requires collection of each firm's name, address, ownership status (DBE or non-DBE), founding date and average annual gross receipts by size class. Additionally, the BBC study team recommends that Caltrans obtain the gender and the race and ethnicity for all firms, including those that are not DBE-certified; complete contact information including e-mail address; DUNS, EIN or other firm identification number; work specialization; and geographic reach.

DBEs and non-DBE prime contractors and subcontractors should be treated equally in complying with this requirement. This initiative would require additional databases and staff time to implement and evaluate bidders' responsiveness or responsibility. Development of a bidders list is a necessary step to implement several of the other recommendations.

Caltrans should record information on all subcontractors at time of award. At present, Caltrans' electronic databases do not consistently record non-DBE subcontractors. Such data collection is a required element of the Federal DBE Program. Caltrans will be unable to accurately track the percentage of subcontracting work that goes to DBEs without these data. Other state departments of transportation have successfully developed these data collection systems.

At present, Caltrans requires construction contractors to submit a Form 1201 that lists subcontractors in order to confirm that the prime contractor is performing more than one-half of the work. District-level staff should record firm information and subcontract amounts for each of the subcontractors (DBEs and non-DBEs alike) into an electronic database. As a requirement to bid, each of these firms would need to be identified in the Caltrans bidders list.

Caltrans should require and record final payment information on all subcontractors. Caltrans does not consistently collect payment information for non-DBE subcontractors. Clarifying and enforcing the reporting requirements for Form 2402 is a first step. Caltrans should train district-level staff to enter these reports into an electronic database of actual utilization.

Caltrans should consider requiring identification of major suppliers and truckers. At present, Caltrans does not require prime contractors to identify suppliers and truckers. Rather, Caltrans requires this information only when a DBE supplier or trucker was used to meet a DBE project goal. Caltrans can more easily track relative DBE and non-DBE supplier and trucker participation if this information were consistently collected at the time of bid and in a final report of utilization. The study team suggests that Caltrans consider extending the reporting requirements of Form 2402 to include suppliers and truckers.

Caltrans should require and record proposed and actual utilization for transportation engineering contracts and task orders. Several districts have developed electronic databases that track invoice amounts for prime consultants and subconsultants on engineering contracts. The BBC study team recommends that Caltrans extend these districts' efforts across the Department. Staff in each district should record firm-specific payment information for every task order and contract. The Central Region's invoice tracking procedure and District 8's summary reports are potential models for a new Department-wide system.

To facilitate consistency in reporting procedures across divisions, Caltrans should require the completion of an equivalent to Forms 1201 and 2402 for each task order completed under a contract agreement. District-level staff should enter the information from these forms into an engineering contracts database separate from the invoice tracking spreadsheets discussed above. Such reporting procedures would centralize the relevant utilization data within a single set of contract-specific source documents and provide an additional check between proposed utilization, invoiced expense, and actual utilization.

Caltrans should extend bidders list registration and utilization reporting procedures to state-funded contracts. Data for state-funded contracts provide a point of comparison for evaluating the relative success of any future initiatives that focus on federally-funded contracts. To improve the reliability of these comparisons, Caltrans should require bidders list registration and similar contract reporting procedures for its state-funded contracts as for federally-assisted contracts. The same systems described above and be implemented for state-funded contracts.

Caltrans should require local agencies receiving federally-assisted and state-administered funds to comply with each of the above registration and reporting requirements. Federal DBE Program requirements extend to subrecipients receiving federal assistance administered by Caltrans. Caltrans should work with local agencies to develop consistent bidder registration and data reporting procedures. Caltrans could assist by opening its own bidders list for local agency use. These procedures should resemble those adopted for construction and engineering contracts let by Caltrans and should be applied for all local agency contracts, regardless of the fund's source (federal or state).

As a first step, the BBC study team recommends modifications to and the extension of reporting requirements now contained in Forms 17F and 15G. Additionally, district local assistance engineers should be equipped with a standardized database and guidance for entering firm-specific information for contracts executed using federal and state funds from Local Assistance.

Next Steps in Implementing Recommendations

Implementation of these recommendations across an organization as large and complex as Caltrans is difficult. Other state and federal requirements govern bidding and contract management processes. Districts have different data collection and compilation practices that will need to be standardized. Caltrans works with more than 600 local agencies, all of which may need guidance on any new procedures. A large contractor pool must also be informed about the new requirements.

Because of these complexities, Caltrans should proceed cautiously in implementing the above recommendations. Between now and the June 2007 Disparity Study Report, the study team can assist Caltrans staff in developing detailed strategies for executing these initiatives.

APPENIDIX A.
Definitions of Terms

APPENDIX A.
Definitions of Terms

This appendix provides explanations and definitions useful to understanding the Availability and Disparity Study. These definitions are only relevant in the context of the Caltrans Availability and Disparity Study Interim Report.

Anecdotal evidence. Includes personal accounts of incidents, including of discrimination, told from an individual's perspective.

Availability analysis. Examination of the relative number of DBEs or MBE/WBEs ready, willing and able to perform work related to transportation construction and engineering work for Caltrans or local agencies.

Business. A for-profit company, including all of its establishments (equivalent to "firm").

Business listing. A record in the Dun & Bradstreet database of businesses (or other database). A D&B record is just a "listing" until the study team determines it to actually be a business establishment with a working phone number.

Business establishment. A place of business with an address and working phone number. One firm can have many business establishments. (Same as "establishment.")

California Department of Transportation (Caltrans). The California Department of Transportation (Caltrans), a part of the State's Business, Transportation and Housing Agency, is the owner/operator of California's federal and state highway system, provides inter-city rail services, assists local airports and provides other programs such as transportation safety.

California Unified Certification Program (CUCP) database. The statewide electronic directory of firms certified as DBEs in California under the guidelines in 49 CFR Part 26.

Certified small business. A firm certified by the State of California that, together with affiliates, has employment of 100 or fewer workers and average annual gross receipts of $12 million or less over the previous three years (or if a manufacturer, simply have 100 or fewer employees). To be certified as a small business by the State of California, the firm must also have its principal office in California and have its owners domiciled in California. The firm must be independently owned and operated. It cannot be dominant in its field of operation.

Contract. A legally binding relationship between the seller of goods or services and a buyer.

Contractor. The study team uses "contractor" to refer to firms performing construction contracts.

Controlled. Exercising management and executive authority for a company, per 49 CFR Section 26.71.

Disadvantaged Business Enterprise (DBE). A small business owned and controlled by one or more individuals who are both socially and economically disadvantaged according to the guidelines in the Federal DBE Program (49 CFR Part 26). Membership in certain race and ethnic groups identified under "minority-owned business enterprise" in this appendix may meet the presumption of social and economic disadvantaged. Women are also presumed to be socially and economically disadvantaged. Examination of economic disadvantage also includes investigating the gross revenues and the firm owner's personal net worth (maximum of $750,000 exclusive of equity in a home and in the business). Some minority- and women-owned firms do not qualify as DBEs because of the gross revenue or the net worth requirements. A firm owned by a non-minority male can be certified as a DBE. Tribally-owned concerns can be certified as a DBE if the enterprise meets the requirements in 49 CFR Part 26.

Disparity. A difference or gap between an actual outcome and a reference point. For example, a difference between an outcome for one race/ethnic group and an outcome for non-Hispanic whites may constitute a disparity.

Disparity analysis. Comparisons of actual outcomes with what might be expected based on other data. Analysis of whether there is a "disparity" between DBE utilization and availability is one tool in examining whether there is evidence consistent with discrimination against DBEs.

Disparity index. Computed by dividing percentage utilization by percentage availability and then multiplying the result by 100. A disparity index of 100 indicates "parity."

Dun & Bradstreet. The leading firm in the United States and abroad that provides lists of business establishments and other business information (see www.dnb.com).

Employer firms. Firms with paid employees other than the business owner and family members.

Enterprise. An economic unit that could be a for-profit firm or establishment, not-for-profit organization or public sector organization.

Establishment. See "business establishment."

Federal DBE Program. Unless otherwise specified, "Federal DBE Program" refers to the Disadvantaged Business Enterprise program established by the U.S. Department of Transportation after enactment of the Transportation Equity Act for the 21st Century (TEA-21) as amended in 1998. The elements of the Program are set forth in 49 CFR Part 26.

Federal Highway Administration (FHWA). An agency of the USDOT that works with state and local governments to construct, preserve and improve the National Highway System, other roads eligible for federal aid, and certain roads on federal and tribal lands.

Federal Transit Administration (FTA). An agency of the USDOT that administers federal funding to support local public transportation systems including buses, subways, light rail, passenger ferry boats and other forms of transportation.

Firm. See "business."

Federally-funded contract. Any contract or project funded in whole or in part with FHWA or FTA financial assistance, including loans. As used in this study, it is synonymous with "federally-assisted contract."

Industry. A broad grouping of firms providing related goods or services.

Local agency. Any local government receiving money through the Caltrans Local Assistance Program. More than 600 municipalities, counties and regional agencies receive federal and state transportation funding through the Caltrans Local Assistance Program.

Local Assistance Program. Caltrans program that provides financial support for local agency transportation construction and engineering projects. Local agencies contract for transportation construction and design contracts using funds from this program. Caltrans retains certain oversight in the use of the funds, which may also involve federal funds. Contracts funded through the Local Assistance Program are "local assistance contracts."

Majority-owned businesses. For-profit firms not owned and controlled by minorities or women (see definition of "minorities" below).

Microbusiness. A firm that, together with affiliates, has average annual gross receipts of $2,750,000 or less over the previous three years. For more on this State of California definition, see http://www.pd.dgs.ca.gov/smbus/mbdef.htm.

Minorities. Racial and ethnic groups identified in the federal guidelines in 49 CFR Part 26:

- Black Americans (or "African Americans" in this study), which includes persons having origins in any of the black racial groups of Africa;
- Hispanic Americans, which includes persons of Mexican, Puerto Rican, Cuban, Dominican, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race;
- Native Americans, which includes persons who are American Indians, Eskimos, Aleuts or Native Hawaiians;
- Asian-Pacific Americans, which includes persons whose origins are from Japan, China, Taiwan, Korea, Burma (Myanmar), Vietnam, Laos, Cambodia (Kampuchea), Thailand, Malaysia, Indonesia, the Philippines, Brunei, Samoa, Guam, Hong Kong, and other countries and territories in the Pacific set forth in 49 CFR Section 26.5; and
- Subcontinent Asian Americans, which includes persons whose origins are from India, Pakistan, Bangladesh, Bhutan, the Maldives Islands, Nepal or Sri Lanka.

Minority-owned business (MBE). A firm with at least 51 percent ownership and control by minorities. Minority groups are defined according to federal guidelines, as outlined above. For purposes of this study, a firm need not be certified to be counted as a minority-owned firm. Firms owned by minority women are counted as MBEs in this study (where that information is available).

NAICS code. North American Industry Classification System code that identifies primary line of business of a an enterprise. http://www.census.gov/epcd/www/naics.html.

Non-DBEs. Firms not certified as DBEs.

Non-response bias. Occurs when the observed value to a survey question differs from what would be obtained if all individuals in a population, including non-respondents, answered the question.

Owned. Ownership of at least 51 percent of a company. A "minority-owned" firm is at least 51 percent owned by one or more minorities. (For DBE certification, additional guidelines are set forth in 49 CFR Section 26.69.)

Prime consultant. The professional services firm performing a contract for an end user such as Caltrans.

Prime contract. The contract between the seller and an end user such as Caltrans.

Prime contractor. The firm performing a contract for an end user such as Caltrans.

Race-and gender-conscious. Remedies that apply to individuals or firms that includes some races and ethnicities and not others, and women and not men. This term is equivalent to "race- and gender-based." A DBE contract goal is one example of a race- and gender-conscious remedy. Note that this term is more accurately "race-," "*ethnicity*-" and "gender-" conscious. For ease of communication, the study team has shortened this to "race- and gender-conscious" remedies.

Race- and gender-neutral. Remedies that apply to individuals or firms that are not classified based on race, ethnicity or gender. Note that this term is more accurately "race-," "*ethnicity*-" and "gender-" neutral. For ease of communication, the study team has shortened this to "race- and gender-neutral."

Race- and gender-neutral remedies may include assistance in overcoming bonding and financing obstacles, simplifying bidding procedures, providing technical assistance, establishing programs to assist start-up firms, and other methods open to all firms or any disadvantaged firm regardless of race or gender. (A broader list of examples can be found in 49 CFR Section 26.51(b).)

Relevant geographic market area. The geographic area that contains most establishments receiving Caltrans or local agency transportation construction and engineering-related work, based on dollars. It is also referred to as the "local marketplace."

Remedy. A program element designed to address barriers to full participation for a particular group.

SIC code. Standard Industrial Classification code, which describes the primary business of a firm (see SIC Manual at http://www.census.gov/epcd/www/sic.html). The federal government groups firms into industries down to 4-digit SIC codes. Dun and Bradstreet further classifies types of work to the 8-digit level.

Small business. In general, a firm with low revenues or employment size relative to other firms in the industry. "Small business" does not necessarily mean that the firm is certified as such.

Small Business Administration (SBA). The U.S. Small Business Administration, which is an independent agency of the United States government.

State-funded contract. Any contract or project funded in whole or in part with State of California funds administered through Caltrans that does not include federal funds.

Statistically significant difference. A difference in which chance in the sampling process can be eliminated as a cause, at the 95 percent confidence level (meaning that chance in the sampling process could still explain the difference in no more than 5 out of 100 cases).

Subconsultant. A professional services firm performing a service for the prime consultant as part of a larger contract.

Subcontract. The contract between a prime contractor and another firm selling services to the prime contractor.

Subcontractor. A firm performing a service for a prime contractor as part of a larger construction project.

Subrecipient. Local agency receiving USDOT financial assistance directly from Caltrans.

Supplier. A firm selling supplies to a firm as part of a larger project.

Transportation construction and engineering. Work involving construction, design or related services concerning transportation facilities or projects.

USDOT. U.S. Department of Transportation, which includes the Federal Highway Administration, the Federal Transit Administration and the Federal Aviation Administration.

Work field. A narrow grouping of firms providing related goods or services, sometimes referred to as "work specialty." Sometimes a work field is one 4- or 8-digit SIC code. In other cases, it combines 4-digit SIC codes.

Utilization. Percentage of total dollars of a type of work going to DBEs or MBE/WBEs (or another group).

Women-owned business (WBE). A firm with at least 51 percent ownership and control by women. For this study, a firm need not be certified as a WBE or DBE to be counted as a woman-owned firm. In addition, firms owned and controlled by minority women are counted as minority-owned firms. Therefore, WBEs principally refer to firms owned by white women.

APPENDIX B.
Legal Environment for Caltrans DBE Program

APPENDIX B.
Legal Environment for Caltrans DBE Program

The California Department of Transportation ("Caltrans") is a recipient of federal funds from the United States Department of Transportation ("USDOT"). Therefore, Caltrans must comply with federal regulations (49 CFR Part 26) and implement the Federal Disadvantaged Business Enterprise (DBE) Program. Caltrans is required to develop and submit for approval to the USDOT its DBE program, including an overall goal for DBE participation on federally-funded contracts.[1] The annual DBE goal, depending on the evidence available to Caltrans, may be achieved through the use of race- and gender-neutral means, race- and gender-conscious means, or a combination of these measures.[2]

Caltrans is responsible for serious, good faith consideration of workable race- and gender-neutral means, including those identified in 49 CFR Section 26.51(b), that can be implemented.[3] The USDOT has advised that recipients should take affirmative steps to use as many of the race-neutral means of achieving DBE participation identified at 49 CFR Section 26.51(b) as possible.[4] The Ninth Circuit Court of Appeals in *Western States Paving Co. v. Washington State DOT* found that "the regulations require a state to 'meet the maximum feasible portion of [its] overall goal by using race neutral means.'"[5] In formulating its implementation of the Federal DBE Program, Caltrans must assess how much of the annual DBE goal can be met through neutral means and what percentage, if any, should be met through race- and gender-conscious means.

Race- or gender-conscious measures are not appropriate unless they are to remedy identified discrimination or its effects in the state transportation contracting industry. If Caltrans implements race- and gender-conscious measures, it is subject to the "strict scrutiny" analysis as applied by the courts.[6] The first prong of the strict scrutiny analysis requires a governmental entity to have a "compelling governmental interest" in remedying past identified discrimination. The Ninth Circuit and other federal courts have held that, with respect to the Federal DBE Program, state departments of transportation ("DOTs") do not need to independently satisfy this prong because Congress has

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[1] 49 CF. Section 26.45.

[2] 49 CFR Sections 26.45, 26.51.

[3] 407 F.3d 983, 993 (9th Cir. 2005) (citing 49 CFR Section 26.51(a)).

[4] Questions and Answers Concerning Response to *Western States Paving Company v. Washington State Department of Transportation* [hereinafter DOT Guidance], available at http://www.fhwa.dot.gov/civilrights/dbe_memo_a5.htm. See 49 CFR Section 26.9 (January 2006).

[5] 407 F.3d at 993; 49 CFR Section 26.51.

[6] See *City of Richmond v. J.A. Croson*, 488 U.S. 469 (1989); *Adarand Constructors, Inc. v. Pena*, 515 U.S. 200 (1995); *Western States Paving*, 407 F.3d 983. The Ninth Circuit Court of Appeals and other courts have applied "intermediate scrutiny" to gender-conscious programs. The Ninth Circuit has interpreted this standard to require that gender-based classifications be: (1) Supported by both an exceedingly persuasive justification; and (2) Substantially related to the achievement of that underlying objective. See *Western States Paving*, 407 F.3d at 990 n6; *Coral Constr. Co. v. King County*, 941 F.2d 910, 931 (9th Cir. 1991); *Equal. Found. v. City of Cincinnat*i, 128 F.3d 289 (6th Cir. 1997).

satisfied the compelling interest test of the strict scrutiny analysis.[7] The second prong of the strict scrutiny analysis requires that a state DOT's implementation of the Federal DBE Program be "narrowly tailored" to remedy identified discrimination in a particular state's transportation contracting and procurement market.[8]

The narrow tailoring requirement has several components. According to the Ninth Circuit in *Western States Paving*, a state must have evidence of discrimination within the state's own transportation contracting marketplace in order to determine whether or not there is the need for race- or gender-conscious remedial action.[9] Thus, mere compliance with the Federal DBE Program does not necessarily satisfy strict scrutiny.[10] Second, the court found that even where evidence of discrimination is present in a state, a narrowly tailored program should apply only to those minority groups who have actually suffered discrimination. For a specific minority group to be included in any race-conscious elements in a state's implementation of the Federal DBE Program, there must be evidence that the group suffered discrimination or its effects within the local marketplace.[11]

Federal courts have held that additional factors may also be pertinent in determining whether a state DOT's implementation of the Federal DBE Program is narrowly tailored: flexibility and duration of a race-conscious remedy, relationship of the numerical DBE goals to the relevant market, effectiveness of alternative race- and gender-neutral remedies, and impact of a race-conscious remedy on third parties.[12]

In *Western States Paving*, the United States intervened to defend the Federal DBE Program's facial constitutionality, and, according to the court, stated "that [the Federal DBE Program's] race conscious measures can be constitutionally applied only in those states where the effects of discrimination are present."[13] Accordingly, the USDOT has advised federal aid recipients that any use of race-conscious measures must be predicated on evidence that the recipient has concerning discrimination or its effects within the local transportation contracting marketplace.[14]

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[7] *Northern Contracting, Inc. v. Illinois DOT*, 473 F.3d 715, 721 (7th Cir. 2007), *reh'g and reh'g en banc denied* (7th Cir. 2007); *Western States Paving*, 407 F.3d at 991; *Sherbrooke Turf, Inc. v. Minnesota DOT and Gross Seed Co. v. Nebraska Dep't of Road*, 345 F.3d 964, 969 (8th Cir. 2003); *Adarand Constructors, Inc. v. Slater* (*Adarand VII*), 228 F.3d 1147, 1176 (10th Cir. 2000).

[8] *Western States Paving*, 407 F3d at 995-998; *Sherbrooke Turf*, 345 F.3d at 970-71.

[9] *Western States Paving*, 407 F.3d at 997-98, 1002-03.

[10] *Id.* at 995-1003. In the recent *Northern Contracting* decision (January 8, 2007), the Seventh Circuit held "that a state is insulated from [a narrow tailoring] constitutional attack, absent a showing that the state exceeded its federal authority. IDOT here is acting as an instrument of federal policy and Northern Contracting (NCI) cannot collaterally attack the federal regulations through a challenge to IDOT's program." 473 F.3d at 722. The Seventh Circuit distinguished both the Ninth Circuit decision in *Western States Paving* and the Eighth Circuit decision in *Sherbrooke Turf*, relating to an as-applied narrow tailoring analysis. The court held that IDOT's application of a federally mandated program is limited to the question of whether the state exceeded its grant of federal authority under the Federal DBE Program. Id. at 722. The court affirmed the district court upholding the validity of IDOT's DBE program.

[11] *Western States Paving*, 407 F.3d at 996-1000.

[12] *See, e.g.*, *id*. at 995; *Sherbrooke Turf*, 345 F.3d at 971; *Adarand VII*, 228 F.3d at 1181.

[13] *Western States Paving*, 407 F.3d at 996; *see also* Br. for the United States, at 28 (April 19, 2004).

[14] *DOT Guidance, available at* http://www.fhwa.dot.gov/civilrights/dbe_memo_a5.htm (January 2006).

Following *Western States Paving*, the USDOT has recommended the use of disparity studies by state DOTs to examine whether or not there is evidence of discrimination or its effects, and how remedies might be narrowly tailored in developing their DBE Program to comply with the Federal DBE Program.[15] The USDOT suggests consideration of both statistical and anecdotal evidence, which should be examined separately for each group presumed to be disadvantaged in 49 CFR Part 26.[16]

Therefore, Caltrans is engaging in a disparity study to comply with the federal regulations and the Federal DBE Program, based on the most recent authority regarding the Federal DBE Program.[17]

[15] *Id.; see also* 42 CFR Section 26.45.

[16] *DOT Guidance, available at* http://www.fhwa.dot.gov/civilrights/dbe_memo_a5.htm (January 2006).

[17] *See Northern Contracting*, 473 F.3d 715; *Western States Paving*, 407 F.3d 983; *Sherbrooke Turf*, 345 F.3d 964; *Adarand VII*, 228 F.3d 1147.

APPENDIX C.
Availability Survey

APPENDIX C.
Availability Survey

This appendix describes study team steps to analyze MBE/WBE availability for transportation construction and engineering work in California. It expands on the analysis presented in Section II, explaining:

- Overall approach;
- Sample frame;
- Questionnaire development;
- Survey execution and performance;
- Statistical confidence in results; and
- Potential limitations.

Overall Approach

BBC contracted with Customer Research International (CRI) to conduct a telephone survey of business establishments. The business establishments surveyed were those identified in a Dun & Bradstreet (D&B) database as doing work in fields closely related to transportation construction and engineering. Only business establishments located in California were included in the survey. The study team attempted to contact every listing in a relevant SIC code rather than draw a sample of listings from the D&B databases. CRI attempted to reach nearly 50,000 business listings. The study team completed surveys with 18,675 business establishments, almost one-half of the establishments with valid phone listings (about 10,000 listings were non-working, duplicate or wrong numbers). After screening for qualifications and interest in future transportation construction and design work, and other factors, BBC was able to analyze MBE/WBE availability based on a database of 3,398 firms.

Sample Frame

BBC developed a sample frame of business establishments based on a D&B database of establishments doing business in California. The study team determined business specializations that accounted for most transportation construction and engineering work. BBC then identified the 4-digit and 8-digit Standard Industrial Classification (SIC) codes best corresponding to that work. D&B provided the list of firms in California with primary lines of business within those SIC codes. (BBC could purchase a list of business establishments by 4- and 8-digit SIC codes but not NAICS codes.)

The study team did not expect every firm in these lines of business to be available for transportation construction or engineering work. In some fields, we anticipated that relatively few firms would perform this work. In the same vein, the study team did not design the survey effort so that each firm possibly performing transportation construction or engineering work would be called as part of the

survey. To do so would require including business sectors marginally related to transportation construction and design. Some firms within the core lines of work encompassed in the survey are also either missing from the D&B database or might not respond to the survey effort. Finally, only firms with California locations were included in the survey.

For these reasons, the survey is not a complete census of all firms possibly available for transportation contracting work in California. The study team's goal was to develop unbiased estimates of the relative availability of MBE/WBEs among firms doing business in California within the lines of work principally involved in transportation contracting.

Identifying the relevant subindustries for Caltrans transportation contracting. BBC determined the types of firms involved in Caltrans transportation construction and engineering services by reviewing firms listed in Caltrans databases for construction and design contracts.

- From Caltrans Division of Engineering Services electronic data, BBC was able to identify firms bidding as prime contractors and first-tier subcontractors on Caltrans construction projects from 2002 to mid-2006. Although these electronic files lacked reliable contract dollar amounts, BBC was able to match names and addresses of these firms against the D&B database of California firms in order to reveal the 8-digit SIC codes for these firms. BBC also examined the types of suppliers and truckers involved in transportation construction.
- For engineering services, BBC identified relevant SIC codes for matched firms from a Caltrans Division of Procurement and Contracts (DPAC) database of prime consultants and select subconsultants receiving Caltrans engineering services and related contracts from 2002 through mid-2006.

The 8-digit SIC codes have been developed by D&B to provide more-precise definitions of firm specializations than the 4-digit SIC codes or the NAICS codes that have been prepared by the federal government. (Note that for some firms, D&B only has the less-specific 4-digit SIC code.) These SIC codes can be translated into NAICS codes as well.

Figure C-1, on the following page, lists the SIC codes for construction-related firms included in the telephone survey. Figure C-1 also identifies the number of business listings by major field in the D&B database. Figure C-2 on page 4, contains similar information for engineering-related fields.

List of establishments to be contacted. Each business establishment with the corresponding SIC code in California for which D&B had a phone number was included in the list purchased from D&B. There was no "sampling" of business establishments from the sample frame.

In the Scope of Services for the Caltrans study, BBC proposed to include 24,000 firms in the telephone survey. The actual survey encompassed many more business establishments. BBC purchased 49,276 listings of business establishments to be contacted as part of the Availability Survey. This includes 32,055 construction-related establishments and 17,221 engineering-related establishments.

Because D&B organizes its database by "business establishment," not by "firm," BBC purchased the business listings in that fashion. Therefore, multiple California locations for a single firm were obtained in the list of establishments to be called. The study team attempted to contact each establishment by telephone. (BBC's methods for consolidating information for multiple establishments into a single record for a firm are described later in this appendix.)

Figure C-1.
Subindustries surveyed in transportation construction fields

				Number of Business Establishments
Highway and street construction				**2,434**
1611-9901	General contractor, highway and street	1611-9902	Highway and street maintenance	
1611-0200	Surfacing and paving	1611-0205	Resurfacing contractor	
1611-0000	Highway and street construction	1611-0207	Gravel or dirt road construction	
1611-0203	Grading	1611-0102	Highway and street sign installation	
1611-0204	Highway and street paving contactor	1611-0100	Highway signs and guardrails	
1611-0202	Concrete construction: roads, highways	1611-0101	Guardrail construction, highways	
Bridge, tunnel and elevated highway construction				**116**
1622-0000	Bridge, tunnel and elevated highway	1622-9903	Tunnel construction	
1622-9901	Bridge construction	1622-9904	Viaduct construction	
1622-9902	Highway construction, elevated			
Water, sewer and utility lines				**1,205**
1623-0000	Water, sewer and utility lines	1623-0201	Cable laying construction	
1623-9906	Underground utilities contractor	1623-0103	Oil and gas pipeline construction	
1623-0302	Sewer line construction	1623-9901	Electric power line construction	
1623-9904	Pipeline construction	1623-9903	Pipe laying construction	
1623-0300	Water and sewer line construction	1623-9902	Manhole construction	
1623-0203	Telephone and communication line construction	1623-0101	Gas main construction	
1623-0303	Water main construction	1623-0301	Aqueduct construction	
Electrical work				**9,713**
1731-0000	Electrical work	1731-0200	Electronic controls installation	
1731-9903	General electrical contractor	1731-0302	Fiber optic cable installation	
1731-0300	Communications specialization	1731-0201	Computerized controls installation	
1731-0100	Electric power systems contractors	1731-0103	Standby or emergency	
1731-9904	Lighting contractor		power specialization	
Concrete work				**4,103**
1771-0000	Concrete work	1771-0103	Gunite contractor	
1771-9901	Concrete pumping	1771-9905	Patio construction, concrete	
1771-0301	Blacktop (asphalt) work	1771-0102	Grouting work	
1771-9904	Foundation and footing contractor	1771-0303	Parking lot construction	
1771-0300	Driveway, parking lot and blacktop	1771-0201	Curb construction	
1771-9902	Concrete repair	1771-0202	Sidewalk contactor	
Structural steel erection				**552**
1791-0000	Structural steel erection	1791-9909	Storage tanks, metal: erection	
1791-9905	Iron work, structural	1791-9907	Precast concrete structural framing	
1791-9902	Concrete reinforcement, placing of		or panels, placing of	
1791-9901	Building front installation, metal			
Water well drilling				**370**
1781-0000	Water well drilling			
1781-9902	Servicing, water wells			
Excavation work				**1,843**
1794-0000	Excavation work			
1794-9901	Excavation and grading, building construction			
Wrecking and demolition				**480**
1795-9902	Demolition, buildings and other structures	1795-9901	Concrete breaking for streets	
1795-0000	Wrecking and demolition work		and highways	
1795-9903	Dismantling steel oil tanks			

Note: 8-digit SIC codes were developed by Dun & Bradstreet.

Source: BBC Research and Consulting from Dun & Bradstreet Marketplace, 2006.

Figure C-1. (continued)
Subindustries surveyed in transportation construction fields

				Number of Business Establishments
Asphalt paving mixtures and blocks				**127**
2951-0000	Asphalt and paving mixtures and blocks			
2951-0201	Asphalt and asphaltic paving mixtures (not from refineries)			
Construction sand and gravel				**129**
1442-0000	Construction sand and gravel	1442-0102	Construction sand mining	
1442-0201	Gravel mining	1442-0100	Sand mining	
1442-0101	Common sand mining	1442-0200	Gravel and pebble mining	
Ready-mixed concrete				**525**
3273-0000	Ready-mixed concrete			
All trucking				**9,544**
4212-0000	Local trucking, without storage	4213-9902	Building materials transport	
4213-0000	Trucking, except local	4213-9905	Heavy machinery transport, local	
4212-9905	Dump truck haulage	4212-0202	Petroleum haulage, local	
4213-9904	Heavy hauling, nec	4213-9908	Liquid petroleum transport, non-local	
4212-9907	Hazardous waste transport	4212-9904	Draying, local: without storage	
4212-0201	Liquid haulage, local	4212-0200	Liquid transfer services	
4212-9908	Heavy machinery transport, local	4212-9912	Steel hauling, local	
4213-9909	Mobile homes transport			
Heavy construction equipment rental				**887**
7353-0000	Heavy construction equipment rental	7353-0101	Oil field equipment, rental or leasing	
7353-9901	Cranes and aerial lift equipment, rental or leasing	7353-0100	Oil equipment rental services	
7353-9902	Earth moving equipment, rental or leasing	7353-0102	Oil well drilling equipment, rental or leasing	

Note: 8-digit SIC codes were developed by Dun & Bradstreet.

Source: BBC Research and Consulting from Dun & Bradstreet Marketplace, 2006.

Figure C-2.
Subindustries surveyed in transportation engineering fields

SIC Code	SIC description	Number of Business Establishments	SIC Code	SIC description	Number of Business Establishments
0711-9906	Soil testing services	29	8731-0302	Environmental research	161
0781-0201	Landscape architects	717	8733-0201	Archeological expeditions	27
0781-0000	Landscape counseling and planning	418			
			8734-0000	Testing laboratories	591
7389-0200	Inspection and testing services	642	8734-0300	Pollution testing	25
7389-0800	Mapmaking services	29	8734-9909	Soil analysis	27
7389-0801	Mapmaking or drafting, including aerial	36	8734-0301	Hazardous waste testing	23
8711-0000	Engineering services	4,457	8741-9902	Construction management	885
8711-9903	Consulting engineering	2,403			
8711-0402	Civil engineering	1,070	8742-0402	Construction project management	267
8711-9905	Electrical or electronic engineering	600	8742-0410	Transportation consultant	231
8711-0404	Structural engineering	568			
8711-0401	Building construction consultant	343	8744-9904	Environmental remediation	79
8711-0400	Construction and civil engineering	197			
8711-9901	Acoustical engineering	68	8748-9905	Environmental consultant	1,674
8711-0101	Pollution control engineering	31	8748-0200	Urban planning and consulting services	252
			8748-0204	Traffic consultant	88
8712-0101	Architectural engineering	304			
			8999-0700	Earth science services	186
8713-0000	Surveying services	634	8999-0701	Geological consultant	159

Note: 8-digit SIC codes were developed by Dun & Bradstreet.

Source: BBC Research and Consulting from Dun & Bradstreet Marketplace, 2006.

Questionnaire Development

Development of survey instrument. The study team drafted a telephone survey to collect business information from transportation construction and engineering firms. Before this survey was used in the field, Caltrans staff reviewed the survey instrument, and it was tested in a pilot survey. The basic survey document for construction firms is provided in Figure C-5 at the end of this appendix. The survey was slightly modified for certain groups of firms based on line of work in order to use the terms commonly employed in those fields. For example, the words "prime consultant" and "subconsultant" were substituted for "prime contractor" and "subcontractor" when surveying engineering-related firms.

A fax version of the survey was also developed. This version was faxed or e-mailed to firm owners or managers initially contacted by telephone who requested that a survey be faxed or e-mailed to them. They then returned the survey to BBC via fax or e-mail.

Survey structure. The telephone and fax/e-mail surveys included the following sections. Note that each area of questions was asked of all firms. Interviewers did not know ownership status when calling a firm. (Beginning on page 14, Figure C-5 reproduces the survey instrument in its entirety.)

Identification of purpose. The survey began by identifying the California Department of Transportation as the survey sponsor and describing the purpose of the study (identifying firms doing transportation construction or engineering work in California).

Verification of correct firm name. The interviewer verified that he or she had reached the correct business, and if not, inquired about the correct contact information for that business. When the firm name was not correct, interviewers asked if the respondent knew how to contact the company. The BBC study team followed up with the desired company based on the new contact information (see areas "X" and "Y" of the Availability Survey in Figure C-5).

Performance of transportation construction or engineering work. Firms were asked, "First, I want to confirm that your firm does work related to transportation construction, maintenance or design. Is this correct?" Interviewers continued with firms responding "yes" to this question (Question A1). BBC instructed interviewers that "doing work" included trying to sell this work.

Verification of for-profit business status. The interviewer also asked whether the organization was a for-profit business as opposed to a government or not-for-profit entity (Question A2). Interviewers continued with firms responding "yes" to this question.

Confirmation of main line of business. Firms were asked to confirm industry classification from the D&B database (Question A3). Firms seeking to change or clarify this description were then asked to identify their main line of business (Question A4). (After the survey was complete, BBC coded the new information on main line of business into appropriate SIC codes.)

Sole location, or multiple locations. Because the study team surveyed business establishments, business owners and managers were asked if they had other locations in California (Questions A5–A6). They were also asked if the establishment was an affiliate or subsidiary of another firm (Questions A8–A9). (A discussion of how BBC consolidated this information into a single response for a firm is presented later in this appendix.)

Past bids or work with Caltrans, local governments and the private sector. The survey inquired about bids for or work on past Caltrans, local government and private sector transportation projects. This area of questions asked whether the firm had bid or worked as a prime contractor or as a subcontractor or supplier (Questions B1–B12).

Qualifications and interest in future transportation work. Firm representatives were asked about their qualifications and interest in future transportation work. The survey questions asked whether they were qualified and interested in work for Caltrans and/or local governments. Separate questions asked about qualifications and interest in this work as a prime contractor and/or as a subcontractor (Questions B13–B14).

Largest contracts. Interviewers asked firms to identify the largest transportation-related contract or subcontract they had been awarded in California in the past five years. They were also asked about the largest contract or subcontract that they had bid on in California in the past five years (Questions D2–D4).

Geographic areas. Interviewers asked a series of questions to identify the geographic areas in which the firm could work. These geographic areas included counties and regions of the state (organized to correspond with Caltrans districts) (Questions C3–C16).

Ownership. Firms were asked whether they were at least 51 percent owned and controlled by women and/or minorities (Questions E1–E3).

Certification. All firms were asked if they were certified as a DBE and whether they were certified as a small business enterprise by the State of California (Questions E4–E5).

Business background. Several questions collected information on age of the firm (Question D4), 2005 revenues and number of employees (Questions F1–F6). For firms with multiple establishments in California, the survey also asked about revenue and employee numbers for all of these locations.

Comments about the marketplace and doing business with Caltrans. Near the end of the survey, interviewers asked two open-ended questions concerning general insights on the marketplace (Question G1) and fairness of Caltrans prime contractor contracting practices (Question G2).

Contact information. The survey concluded by collecting complete contact information for the establishment (Questions H1–H6).

Survey Execution and Performance

Interviewers. BBC contracted with Customer Research International (CRI) to conduct the telephone survey. BBC held a training session with interviewers at CRI offices in San Marcos, Texas before starting these interviews. CRI programmed and conducted the interviews and provided daily reports on results. BBC instructed CRI to make up to at least five attempts to reach a person at each phone number. This design is intentionally persistent to minimize non-response.

BBC instructed CRI staff to identify and interview an available company representative such as the owner, manager, chief financial officer or other key official who could answer questions about the company's line of business, past contracts, financial and employment figures, interest in work with various clients, and ownership status. The survey was conducted in fall 2006. BBC collected faxed or e-mailed survey responses through December 2006.

Survey performance. The survey process began with a very large number of D&B business listings for organizations in California in certain lines of work potentially related to transportation construction and engineering. At the end of the survey analysis process, firms reporting that they are available for, had bid on, or had performed transportation construction or engineering work were included in the database used for the availability analysis.

Valid business listings. Some of the business listings purchased from D&B were:

- Duplicate numbers (1,335 listings);
- Non-working phone numbers (4,814 listings); or
- Wrong numbers for the desired businesses (3,216 listings that could not be reached through follow-up calls).

Figure C-3, on the following page, shows how the beginning set of 49,276 listings was reduced to 39,911 because of these factors. Some non-working phone numbers and some wrong numbers for the desired businesses reflect firms going out of business or changing their names and phone numbers between the time that D&B listed them in its database and the time when the study team attempted to contact them.

Figure C-3 also shows the final disposition of the 39,911 business establishments that CRI attempted to contact:

- Slightly more than one-third of these business establishments could not be reached after a minimum of five phone calls (14,221 establishments). Call-backs to these business establishments were made at different times of day and different days of the week in order to maximize response.
- About 5 percent of these business establishments could not provide a staff member to answer the survey after a minimum of five phone calls (2,096 establishments).
- Surveys were only conducted in English. About 2 percent of these business establishments could not communicate with the interviewer due to language barriers (790 establishments).
- Four percent refused to participate in the interview (1,731 establishments).
- About 6 percent asked the study team to send the survey via fax or e-mail but did not successfully obtain the fax or e-mail (after multiple attempts) or received the survey but did not return a completed survey to BBC (2,398 establishments).

In sum, BBC obtained completed surveys from 18,675 business establishments, or about 47 percent of the business establishments with valid phone listings. This level of response to a business survey is relatively high. The very large number of responses and the high response rate add to the statistical validity of the study.

Figure C-3.
Disposition of attempts to survey D&B business listings

Note:
* After multiple attempts to complete survey.

Source:
BBC Research & Consulting from 2006 Availability Survey.

	Number of Firms	Percent of Business Listings
Beginning List	**49,276**	
Less duplicate numbers	1,335	
Less non-working phone numbers	4,814	
Less wrong number/business	3,216	
Business listings contacted	**39,911**	
Less no answers*	14,221	35.63%
Less couldn't reach responsible staff member*	2,096	5.25%
Less language barriers*	790	1.98%
Less refused to answer	1,731	4.34%
Less unreturned fax/e-mail*	2,398	6.01%
Firms that completed surveys	**18,675**	**46.79%**

Firms that report being available for transportation construction and engineering work. Among the D&B listings successfully contacted, only a portion is deemed available for any type of Caltrans or local government transportation construction and engineering work, as explained below:

- Two-thirds of the firms that completed a survey indicated they did not perform transportation construction, maintenance or design work (12,620 establishments). The survey ended when a business owner or manager reported that the business did not do this type of work.
- About 1 percent of the surveyed establishments were excluded because they were an organization other than a for-profit business (168 establishments). Non-profit and public sector agencies were not to be included in the survey as the availability analysis focuses on for-profit firms. The survey ended when a respondent reported that the establishment was something other than a for-profit business.
- About 1 percent of surveyed establishments indicated that they were involved in transportation construction, maintenance or design work but reported main lines of work that were well outside the scope of the Availability Survey (180 establishments). For example, some firms identified by D&B as highway construction or concrete firms reported in the survey that they did transportation construction-related work, but that their primary line of business was single family homebuilding or other specialty outside the scope of the study. CRI completed the full survey with these firms. Prior to analyzing results, BBC excluded them from the final data set.
- About 300 individual establishments of multi-location firms completed the survey. Prior to analyzing results, BBC collapsed responses from these multiple establishments into a single response (described below). This removed 183 survey records from the data set (1 percent of total completed surveys).
- Nearly 400 additional firms were eliminated from the count of firms available for Caltrans or local agency transportation projects because they said they were not interested in either prime contracting or subcontracting opportunities on such projects.
- Approximately 1700 firms who were interested in future projects in California were eliminated from the count of firms available for Caltrans and local agency transportation projects because they had never bid or received award for similar projects in any sector in California.
- Twenty firms were eliminated from the count of firms available for Caltrans and local agency work because they did not provide valid responses to the questions about geographic scope.

After these exclusions, the survey effort produced a database of 3,398 for-profit firms in California that were in the lines of business pertinent to the survey and reported they did work related to transportation construction, maintenance or design (see Figure C-4). This data set is large relative to data typically used in economic or other social science research.

Figure C-4. Screening of completed business telephone interviews for possible inclusion in the availability analysis

Source:

BBC Research & Consulting from 2006 Availability Survey.

	Number of Firms	Percent of Business Listings
Firms that completed surveys	**18,675**	**100.0%**
Less no transportation work	12,620	67.6%
Less not a business	168	0.9%
Less line of work outside of scope	180	1.0%
Less multiple establishments	183	1.0%
Firms available for transportation work	**5,524**	**29.6%**
Less no interest in furture work	398	
Less no past bid/award	1,708	
Less missing geographic scope	20	
Total	**2,126**	
Firms available for Caltrans and local agency work	**3,398**	

Study team identification and coding of responses from multi-location firms. Multiple responses from different establishments operating under the same firm name were combined into a single, summary case according to the following rules:

- If any of the establishments reported bidding or working on a contract within a particular sector, the firm summary for that variable was coded to an affirmative response for the corresponding sector;
- The types of work (prime contractor, subcontractor, supplier, trucker) that establishments reported were summed to a single variable, again corresponding to the appropriate sector; and
- If any establishment said that it was interested and able to work within one of the ten geographic regions (see part C of the survey instrument in Figure C-5), the firm summary reflected that geographic scope.

Except when there was a 50-year discrepancy among the individual in a set of establishments' self-reported founding dates, the firm summary variable matches the median founding date provided by the multiple establishments. The firm summary variables for contract sizes and California-wide revenue are equivalent to the largest dollar amounts indicated by any of its establishments. The summary number of firm employees in California is equal to the most common or the mean response of the multiple establishments. Finally, firms with multiple locations were recoded as woman- or minority-owned, DBE, or certified small businesses if the majority of duplicate establishments indicated such status.

Statistical Confidence in Results

BBC calculated confidence intervals for the MBE/WBE availability estimates. Because of the large sample relative to the population of firms, BBC employed a finite population correction factor in determining the standard errors and confidence intervals around these estimates from the Availability Survey. The 95 percent confidence interval for MBE/WBE availability across all industries and roles is +/- 0.6 percentage points.

Potential Limitations

The study team explored several possible limitations in its approach to estimating relative availability. These include:

- Assessing relative MBE/WBE availability and not providing a count of all firms available for transportation construction and engineering work;
- Use of a telephone survey of firms as an approach to determining relative MBE/WBE availability for a state DOT's contracts;
- Use of D&B as the sample frame;
- Selection of specific SIC codes to define the sample frame;
- Non-response bias; and
- Reliability of answers to survey questions.

Not providing a count of all firms available for Caltrans work. The purpose of the survey is to estimate the *percentage* of firms available for transportation construction and engineering work that are minority- and women-owned and controlled (i.e., "relative" MBE/WBE availability). The survey provides such information. The survey does not provide a comprehensive listing of every firm available for transportation work and should not be used as such.

Such a comprehensive listing is not possible because firms do not need to pre-qualify or pre-register to perform Caltrans transportation contracting work. Even if such a list existed, there could be firms available for Caltrans work that had not taken steps to place their business on the list.

The survey approach of measuring relative availability has been approved by federal courts (see, for example, the Seventh Circuit decision on *Northern Contracting*) when considering state implementation of the Federal DBE Program. [1] Use of a survey is recommended as an approach to measuring availability in the USDOT guidance on goal-setting. [2]

Use of a telephone survey. USDOT guidance for determining relative availability of DBEs mentions simply dividing the number of firms in an agency's DBE directory by the total firms in the marketplace, as reported in U.S. Census data. As another option, the USDOT suggests using a list of pre-qualified firms or a bidder list to analyze the relative availability of DBEs for an agency's contracts and subcontracts.

There are several reasons the study team rejected these approaches:

- Dividing a simple count of certified DBEs by a U.S. Census count of total firms does not provide the data on firm characteristics the study team desired for this Availability and Disparity Study. For example, the survey provides additional data on individual firms' qualifications and interest in transportation work.

[1] *N. Contracting, Inc. v. Illinois DOT,* 473 F.3d 715 (7th Cir. 2007)

[2] USDOT. *Tips for Goals Setting in the Disadvantaged Business Enterprise (DBE) Program* (http://osdbu.dot.gov/?TabId=133)

- As mentioned previously, Caltrans does not typically pre-qualify firms to bid as prime contractors or subcontractors, especially for construction contracts. There is no comprehensive pre-qualification list.
- Although Caltrans has attempted to develop a bidder list, initial efforts have been relatively unsuccessful. Firms are not required to be on the Caltrans bidders list to compete for Department prime contracts and subcontracts.
- A "custom census" approach to measuring availability that starts with D&B data has been positively reviewed by the court cases involving DBE goal setting for state departments of transportation (see, for example, *Northern Contracting* in Appendix C).

The methodology applied in the Caltrans study takes this "custom census" approach and adds several layers of refinement in more precisely measuring MBE/WBE availability.

For all of these reasons, the study team selected use of a telephone survey.

Use of D&B data as the sample frame. Dun & Bradstreet provides the most comprehensive private database of business listings in the United States. Even so, this database does not include all establishments operating in California:

- **New firms.** There can be a lag between formation of a new business and inclusion in the database. This means that the newest firms are underrepresented in the sample frame. Based on the firms successfully interviewed in the Availability Surveys, newly formed firms are more likely than older firms to be minority- or women-owned, which suggests that MBEs and WBEs might be underrepresented in the final database of surveyed firms.
- **Home-based businesses.** The D&B database is more likely to miss a business working out of the home than a firm with a distinct business office. Small, home-based firms are more likely than large firms to be minority- or women-owned, which again suggests that MBEs and WBEs might be underrepresented in the final survey data set.

Selection of specific SIC codes to define the sample frame. Defining an industry based on specific SIC codes (or NAICS codes) is a standard step when analyzing an economic sector. Government and private sector economic data are typically organized according to these industry codes. As with any such research, there are limitations when choosing the specific SIC codes to define the sample frame for an industry survey.

First, it was not possible for BBC to include all lines of work possibly related to transportation construction and engineering in the Availability Survey without surveying nearly every industry in California. In addition, the availability analysis and utilization analysis were conducted concurrently in this study. At the time the sample frame was developed in August 2006, BBC had limited information on the business specializations involved in Caltrans transportation construction and engineering work.

Both of these potential limitations have negligible effect on the availability analysis. Post-survey comparison of the SIC codes for firms receiving Caltrans prime contracts and subcontracts found that the lines of work included in the survey accounted for 85.6 percent of total dollars of Caltrans work from 2002 through 2006. Surveying firms in additional SIC codes would be unlikely to have a material effect on the availability estimates.

A further limitation to the use of SIC codes to classify businesses, or any other work type classification method, is that some SIC codes are imprecise and overlap with other business specialties. Even though BBC used D&B's own 8-digit SIC codes, D&B does not maintain a detailed 8-digit code for each firm in its database. In addition, businesses often span several types of work, even at the 4-digit SIC code level of specificity. This overlapping makes classifying businesses into a single line of business difficult and imprecise. When firm owners and managers were asked to identify primary lines of business, they often gave broad answers. For these reasons, BBC collapsed many of the SIC codes into broader work categories in the final database of firms available for transportation-related work. This presents a more accurate assessment of MBE/WBE availability by work field than possible at a finer level of detail. However, this approach sacrifices the ability to separate relatively narrow areas of expertise such as traffic control or guardrail work (which was not possible to obtain from the D&B information).

Note that BBC translated these SIC codes into NAICS codes for future reference. This translation was completed using correspondence tables available from the United State Census Bureau (see http://www.census.gov/epcd/naics02/). These tables use the revised 2002 NAICS manual, which features substantial changes in the construction and wholesale trade industries.

Non-response bias. Analysis of non-response bias considers whether firms not successfully surveyed are different from those successfully surveyed and included in the final data set for analysis. There are opportunities for non-response bias in any survey. The study team considered the potential for non-response bias due to:

- Survey sponsorship;
- Work specializations; and
- Language barriers.

Survey sponsorship and introduction. Interviewers introduced the survey by identifying Caltrans as the survey sponsor in order to encourage firms that performed transportation construction and engineering work to participate in the interview. Firms would be less likely to answer somewhat sensitive business questions asked by an interviewer unable to identify the sponsor of the survey. In fact, some firms asked to check with Caltrans to verify its sponsorship prior to answering the survey.

Analysis of survey refusal rates suggests that sponsorship had an overwhelmingly positive effect on response rates. Only 4 percent of business listings potentially contacted refused to answer the survey.

Work specializations. Businesses in highly-mobile fields, such as trucking, may be more difficult to reach than firms more likely to work out of a fixed office (e.g., engineering firms). This suggests that survey response rates will differ by business specialization.

If all surveyed firms were simply counted to determine relative MBE/WBE availability, this would lead to estimates that relied too heavily on fields that could be easily contacted by telephone. This potential non-response bias is minimal in this study because the availability analysis compares firms within work fields before determining an MBE/WBE availability figure. In other words, the potential for trucking firms to be less likely to complete a survey is less important because the number of MBE/WBE trucking firms completing surveys is compared with total number of trucking firms, not all firms across all fields.

Language barriers. Caltrans contracting documents are in English and not other languages. The study team made the decision to only include businesses able to complete the survey in English in the availability analysis so to remove language barriers as a potential explanation for any differences in outcomes observed between MBE/WBEs and majority-owned firms.

Individuals who could not communicate in English well enough to complete the survey and could not locate another individual to answer survey questions in English were not captured in the survey research. Further investigation found that the majority of these spoke Spanish and a smaller proportion spoke an Asian language. Choosing to conduct the study in English and not translate it into other languages may have an effect on the relative number of Hispanic- and Asian-Pacific-owned firms that completed the survey.

Response reliability. Firm owners and managers were asked questions that may be difficult to answer, including firm revenues and employment. For this reason, the study team prompted them with D&B information for their establishment and asked them to confirm that information or provide more accurate estimates. Further, respondents were typically not asked to give absolute figures for difficult questions such as firm revenues. Rather, they were given ranges of dollar figures or employment levels.

BBC explored reliability by analyzing consistency of survey responses for the firm revenues and firm employment questions. BBC found survey responses to these difficult questions to be internally consistent. Firms with smaller employee numbers reported revenues consistent with their employment levels.

Summary

The study team determined that a telephone survey of firms in California was a preferable approach to analyzing availability than relying on: (a) firm counts from the DBE directory and U.S. Census data; (b) pre-qualification lists, which is not a standard Caltrans practice; or (c) a bidders list, which has not yet been successfully implemented by Caltrans.

"Custom census" approaches to availability that begin with D&B data have been reviewed positively by federal courts. The study team's methodology for analyzing MBE/WBE availability takes the previous custom census approach as a starting point and added several layers of additional screening when determining firms available for transportation construction and engineering work.

The availability analysis conducted for Caltrans represents the largest survey to date of potentially available firms conducted in any state or local government disparity study known to the study team. The study team attempted to complete surveys with all firms in California reported by D&B to have a primary line of business within transportation construction and engineering-related SIC codes. (There was no "sampling" from the sample frame in preparing the list of firms to be surveyed.) The study team attempted to contact nearly 50,000 business listings, about 10,000 of which were found to be invalid listings. A relatively high proportion of the remaining establishments were successfully contacted, and more than 18,000 business establishments completed the survey.

BBC examined several potential sources of non-response bias. It is possible that MBEs and WBEs were somewhat under-represented in the final database of available firms. However, BBC concludes that this potential under-representation of MBE/WBEs does not significantly affect the analyses.

Figure C-5.
Survey Instrument

Hello. My name is [*interviewer name*] from Consumer Research International. We are calling for the California Department of Transportation. The Department is developing a comprehensive list of companies involved in transportation construction, maintenance, and design. Whom can I speak with to get the information we need from your firm?

After reaching an appropriately senior staff member, the interviewer should re-introduce the purpose of the survey and begin with questions.

X1. I have a few basic questions about your company and the type of work you do. Can you confirm that this is [*firm name*]?

1=RIGHT COMPANY

2=NOT RIGHT COMPANY

3=REFUSE TO GIVE INFORMATION

Y1. Can you give me any information about [*firm name*]?

1=Yes, same owner doing business under a different name

2=Yes, can give information about named company

3=Company bought/sold/changed ownership

4=No, does not have information

5=Refused to give information

Y1. ENTER NEW NAME

1=VERBATIM

Y2. Can you give me the phone number of [*firm name*]?

(ENTER UPDATED PHONE OF NAMED COMPANY)

1=VERBATIM

Y3. Can you give me the complete address or city for [*firm name*]?

INTERVIEWER - RECORD IN THE FOLLOWING FORMAT:

. STREET ADDRESS

. CITY

. STATE

. ZIP

1=VERBATIM

Y4. And what is the new name of the business that used to be [*firm name*]?

(ENTER UPDATED NAME)

1=VERBATIM

Y5. Can you give me the name of the owner or manager of the new business?

(ENTER UPDATED NAME)

1=VERBATIM

Y6. Can I have a telephone number for them?

(ENTER UPDATED PHONE)

1=VERBATIM

Y7. Can you give me the complete address or city for [*new firm name*]?

1=VERBATIM

Y8. Do you work for this new company?

1=YES - CONTINUE

2=NO - TERMINATE

A1. First, I want to confirm that your firm does work related to transportation construction, maintenance or design. Is this correct?

(NOTE TO INTERVIEWER) - such as, road, bridge or highway construction, guardrail installation, paving and striping work, supplying materials used on these projects, providing trucking or hauling services

(NOTE TO INTERVIEWER) - includes having done work or trying to sell this work

1=Yes

2=No - TERMINATE

A2. Let me confirm that [*firm name / new firm name*] is a business, as opposed to a non-profit organization, a foundation or a government office. Is that correct?

1=Yes, a business

2=No, other - TERMINATE

A3. Let me also confirm what kind of business this is. The information we have from Dun & Bradstreet indicates that your main line of business is [*SIC Code description*]. Is this correct?

(NOTE TO INTERVIEWER - IF ASKED, DUN & BRADSTREET OR D&B, IS A COMPANY THAT COMPILES BUSINESS INFORMATION THROUGHOUT THE COUNTRY)

1=Yes – SKIP TO A5

2=No

98=(DON'T KNOW)

99=(REFUSED)

A4. What would you say is the main line of business at [*firm name / new firm name*]?

(ENTER VERBATIM RESPONSE)

1=VERBATIM

A5. Is this the sole location for your business, or do you have offices in other locations?

1=Sole location – SKIP TO A8

2=Have other locations

98=(DON'T KNOW)

99=(REFUSED)

A6. How many other offices in California?

(ENTER NUMBER OF OFFICES)

(998 = DON'T KNOW)

(999 = REFUSED)

1=NUMERIC (1-999)

A7. Is your company headquartered in California?

1=Yes

2=No

98=(DON'T KNOW)

99=(REFUSED)

A8. Is your company a subsidiary or affiliate of another firm?

1=Independent – SKIP TO B1

2=Subsidiary of another firm

3=Affiliate

98=(DON'T KNOW)

99=(REFUSED)

A9. What is the name of your parent company?

1=ENTER NAME

98=(DON'T KNOW)

99=(REFUSED)

A9. ENTER NAME OF PARENT COMPANY

1=VERBATIM

B1. Next, I have a few questions about your company's role in transportation construction, maintenance or design work. During the past five years, has your company submitted [*a bid* or *qualifications, a proposal* or a *price quote]* for any part of a Caltrans project?

1=Yes

2=No – SKIP TO B3

98=(DON'T KNOW) – SKIP TO B3

99=(REFUSED) – SKIP TO B3

B2. Was that [*a bid* / *a proposal*] or price quote to work as [*a prime contractor, a subcontractor, or a supplier?* or *a prime consultant or subconsultant?*]

1=Prime contractor/consultant
2=Subcontractor/consultant
3=Supplier (or manufacturer)
4=Prime and Sub
5=Sub and Supplier
6=Prime and Supplier
7=Prime, Sub, and Supplier
8=Trucker
10=(Supplier and Trucker)
11=(Prime and Trucker)
12=(Sub and Trucker)
13=(Prime, Supplier, and Trucker)
14=(Sub, Supplier, and Trucker)
15=(Prime, Sub, and Trucker)
16=(Prime, Sub, Supplier, Trucker)
98=(DON'T KNOW)
99=(REFUSED)

B3. During the past five years, has your company received an award for work [*as a prime contractor or as a subcontractor* or *as a prime consultant or as a subconsultant*] to any part of a Caltrans project?

1=Yes
2=No – SKIP TO B5
98=(DON'T KNOW) – SKIP TO B5
99=(REFUSED) – SKIP TO B5

B4. Was that an award to work as [*a prime contractor, a subcontractor, or a supplier?* / *a prime consultant or subconsultant?*]

1=Prime contractor/consultant
2=Subcontractor/consultant
3=Supplier (or manufacturer)
4=Prime and Sub
5=Sub and Supplier
6=Prime and Supplier
7=Prime, Sub, and Supplier
8=Trucker
10=(Supplier and Trucker)
11=(Prime and Trucker)
12=(Sub and Trucker)
13=(Prime, Supplier, and Trucker)
14=(Sub, Supplier, and Trucker)
15=(Prime, Sub, and Trucker)
16=(Prime, Sub, Supplier, Trucker)
98=(DON'T KNOW)
99=(REFUSED)

B5. During the past five years, has your company submitted [*a bid / qualifications, a proposal*] or a price quote for any part of a city, county, or local agency transportation project in California?

1=Yes

2=No – SKIP TO B7

98=(DON'T KNOW) – SKIP TO B7

99=(REFUSED) – SKIP TO B7

B6. Was that [*a bid / a proposal*] or price quote to work as [*a prime contractor, a subcontractor, or a supplier? / a prime consultant or subconsultant?*]

1=Prime contractor/consultant

2=Subcontractor/consultant

3=Supplier (or manufacturer)

4=Prime and Sub

5=Sub and Supplier

6=Prime and Supplier

7=Prime, Sub, and Supplier

8=Trucker

10=(Supplier and Trucker)

11=(Prime and Trucker)

12=(Sub and Trucker)

13=(Prime, Supplier, and Trucker)

14=(Sub, Supplier, and Trucker0

15=(Prime, Sub, and Trucker)

16=(Prime, Sub, Supplier, Trucker)

98=(DON'T KNOW)

99=(REFUSED)

B7. During the past five years, has your company received an award for work [*as a prime contractor or as a subcontractor / as a prime consultant or as a subconsultant*] to any part of a city, county, or local transportation agency project in California?

1=Yes

2=No – SKIP TO B9

98=(DON'T KNOW) – SKIP TO B9

99=(REFUSED) – SKIP TO B9

B8. Was that an award to work as [*a prime contractor, a subcontractor, or a supplier? / a prime consultant or subconsultant?*]

1=Prime contractor/consultant
2=Subcontractor/consultant
3=Supplier (or manufacturer)
4=Prime and Sub
5=Sub and Supplier
6=Prime and Supplier
7=Prime, Sub, and Supplier
8=Trucker
10=(Supplier and Trucker)
11=(Prime and Trucker)
12=(Sub and Trucker)
13=(Prime, Supplier, and Trucker)
14=(Sub, Supplier, and Trucker)
15=(Prime, Sub, and Trucker)
16=(Prime, Sub, Supplier, Trucker)
98=(DON'T KNOW)
99=(REFUSED)

B9. During the past five years, has your company submitted [*a bid / qualifications, a proposal*] or a price quote for any part of a private sector transportation project in California?

1=Yes
2=No – SKIP TO B11
98=(DON'T KNOW) – SKIP TO B11
99=(REFUSED) – SKIP TO B11

B10. Was that [*a bid / a proposal*] or price quote to work as [*a prime contractor, a subcontractor, or a supplier? / a prime consultant or subconsultant?*]

1=Prime contractor/consultant
2=Subcontractor/consultant
3=Supplier (or manufacturer)
4=Prime and Sub
5=Sub and Supplier
6=Prime and Supplier
7=Prime, Sub, and Supplier
8=Trucker
10=(Supplier and Trucker)
11=(Prime and Trucker)
12=(Sub and Trucker)
13=(Prime, Supplier, and Trucker)
14=(Sub, Supplier, and Trucker)
15=(Prime, Sub, and Trucker)
16=(Prime, Sub, Supplier, Trucker)
98=(DON'T KNOW)
99=(REFUSED)

B11. During the past five years, has your company received an award for work [*as a prime contractor or as a subcontractor / as a prime consultant or as a subconsultant*] to any part of a private sector transportation project in California?

1=Yes

2=No – SKIP TO B13

98=(DON'T KNOW) – SKIP TO B13

99=(REFUSED) – SKIP TO B13

B12. Was that an award to work as [*a prime contractor, a subcontractor, or a supplier? / a prime consultant or subconsultant?*]

1=Prime contractor/consultant

2=Subcontractor/consultant

3=Supplier (or manufacturer)

4=Prime and Sub

5=Sub and Supplier

6=Prime and Supplier

7=Prime, Sub, and Supplier

8=Trucker

10=(Supplier and Trucker)

11=(Prime and Trucker)

12=(Sub and Trucker)

13=(Prime, Supplier, and Trucker)

14=(Sub, Supplier, and Trucker)

15=(Prime, Sub, and Trucker)

16=(Prime, Sub, Supplier, Trucker)

98=(DON'T KNOW)

99=(REFUSED)

B13. Now, thinking about future transportation work, is your company qualified and interested in working with Caltrans or local governments in California [*a prime contractor? / a prime consultant?*]

1=Yes (BOTH)

2=(YES, JUST CALTRANS)

3=(YES, JUST LOCAL GOVERNMENTS)

4=No

98=(DON'T KNOW)

99=(REFUSED)

B14. And what about [*as a subcontractor: / as a subconsultant:*] is your company qualified and interested in working with Caltrans and local governments in California?

1=Yes, (BOTH)

2=(YES, JUST CALTRANS)

3=(YES, JUST LOCAL GOVERNMENTS)

4=No

98=(DON'T KNOW)

99=(REFUSED)

C1. I now want to ask you about the geographic area your company serves. You are located in the [*California geographic region*]. Is that correct?

1=Yes – SKIP TO C4

2=No

98=(DON'T KNOW)

99=(REFUSED)

C2. In what county are you located?

(REFER TO COUNTY MASTER LIST)

C3. That means you're in the [*California geographic region*]. Thinking about potential transportation projects, could your company work throughout this region or only in part of the region?

1=Throughout the region – SKIP TO C6

2=Only in parts of region – SKIP TO C5

98=(DON'T KNOW) – SKIP TO C5

99=(REFUSED) – SKIP TO C6

C4. Thinking about potential transportation projects, could your company work throughout this region or only in part of the region?

1=Throughout the region – SKIP TO C6

2=Only in parts of region

98=(DON'T KNOW)

99=(REFUSED) – SKIP TO C6

C5a-bb. What parts of the [*California geographic region*]? Could your company work in [*California geographic sub-region*] ? (READ LIST - READ COUNTIES IF NECESSARY)

1 = Yes

2 = No

3 = Maybe

98 = (DON'T KNOW)

99 = (REFUSED)

C5a=Crescent City (Del Norte County)

C5b=Eureka (Humboldt County)

C5c=Fort Bragg (Mendocino County)

C5d=Clear Lake (Lake County)

C5e=Yuba City and Chico (Yuba, Sutter, Colusa, Glenn, Butte Counties)

C5f=Truckee (Nevada and Sierra Counties)

C5g=Sacramento and its suburbs (Sacramento/Yolo Counties)

C5h=Auburn, Placerville, and South Tahoe (El Dorado/Placer Counties)

C5i=Santa Rosa (Sonoma County)

C5j=Marin County (Marin County)

C5k=Napa-Fairfield (Solano and Napa Counties)

C5l=City of San Francisco (San Francisco County)

C5m=East Bay (Alameda and Contra Costa Counties)

C5n=South Bay (Santa Clara and San Mateo Counties)

C5o=Monterey, Salinas & Santa Cruz (Monterey, and Benitas, Santa Cruz Counties)

C5p=San Luis Obispo (San Luis Obispo County)

C5q=Santa Barbara (Santa Barbara County)

C5r=Stockton (San Joaquin, Amador, Stanislaus, Calaveras, Alpine, Tuolumne)

C5s=Merced (Merced and Mariposa Counties)

C5t=Fresno (Madera, Fresno, Kings, Tulare Counties)

C5u=Bakersfield (Kern County)

C5v=San Bernardino County

C5w=Riverside County

C5x=Los Angeles, Burbank, Long Beach, and Pomona (Los Angeles County)

C5y=Simi Valley, Oxnard, and Ventura (Ventura County)

C5z=Anaheim to San Clemente (Orange County)

C5aa=San Diego to Oceanside (San Diego County)

C5bb=Imperial Valley (Imperial County)

C5xx. OTHER - SPECIFY

1=VERBATIM

C6. Would your company work outside this region as well?

1=Yes

2=No – SKIP TO D1

98=(DON'T KNOW)

99=(REFUSED)

C7. North Coast, which extends from Eureka to the Oregon border. (REPEAT AS NEEDED) Please tell me whether or not your company could be involved in transportation projects in that region.

C8. Shasta-Redding Area, which extends from Redding to the Oregon border. (REPEAT AS NEEDED) Please tell me whether or not your company could be involved in transportation projects in that region.

C9. Sacramento-Tahoe Region, which extends through the Sacramento Valley to Lake Tahoe (REPEAT AS NEEDED) Please tell me whether or not your company could be involved in transportation projects in that region.

C10. San Francisco Bay Area, which extends from San Jose to Santa Rosa. (REPEAT AS NEEDED) Please tell me whether or not your company could be involved in transportation projects in that region.

C11. Central Coast Region, which extends from Santa Barbara to Salinas. (REPEAT AS NEEDED) Please tell me whether or not your company could be involved in transportation projects in that region.

C12. Central Valley, which extends from Bakersfield to Stockton. (REPEAT AS NEEDED) Please tell me whether or not your company could be involved in transportation projects in that region.

C13. Bishop Region, which extends from Bishop to Mono Lake along the Nevada border. (REPEAT AS NEEDED) Please tell me whether or not your company could be involved in transportation projects in that region.

C14. San Bernardino-Riverside Region, which includes San Bernardino and Riverside, east to Arizona. (REPEAT AS NEEDED) Please tell me whether or not your company could be involved in transportation projects in that region.

C15. Los Angeles Basin, which extends from San Clemente to Ventura and east to Pomona and Palm Springs. (REPEAT AS NEEDED) Please tell me whether or not your company could be involved in transportation projects in that region.

C16. San Diego Region, which extends from San Diego and Oceanside east to Arizona. (REPEAT AS NEEDED) Please tell me whether or not your company could be involved in transportation projects in that region.

1=Yes

2=No

98=(DON'T KNOW)

99=(REFUSED)

D1. About what year was your firm established?

(RECORD FOUR-DIGIT YEAR, I.E. '1977')

(9998 = DON'T KNOW)

(9999 = REFUSED)

1=NUMERIC (1600-2006)

D2. In rough dollar terms, what was the largest transportation-related contract or subcontract your company was awarded in California during the past five years?

(NOTE TO INTERVIEWER: INCLUDES CONTRACTS NOT YET COMPLETE)

(READ CATEGORIES IF NECESSARY)

1=$100,000 or less

2=More than $100,000 to $500,000

3=More than $500,000 to $1 million

4=More than $1 million to $2 million

5=More than $2 million to $5 million

6=More than $5 million to $10 million

7=More than $10 million to $20 million

8=More than $20 million

97=(NONE)

98=(DON'T KNOW)

99=(REFUSED)

D3. Was this the largest transportation-related contract or subcontract that your company [*bid / proposed*] on or submitted quotes for in California during the past five years?

1=Yes – SKIP TO D5

2=No

98=(DON'T KNOW) – SKIP TO D5

99=(REFUSED) – SKIP TO D5

D4. What was the largest transportation-related contract or subcontract that your company [*bid/proposed*] on or submitted quotes for in California during the past five years?

(READ CATEGORIES IF NECESSARY)

1=$100,000 or less

2=More than $100,000 to $500,000

3=More than $500,000 to $1 million

4=More than $1 million to $2 million

5=More than $2 million to $5 million

6=More than $5 million to $10 million

7=More than $10 million to $20 million

8=More than $20 million

97=(NONE)

98=(DON'T KNOW)

99=(REFUSED)

D5. [ASK ONLY IF B4=3, 5, 6, OR 7] Now thinking of all of your firm's locations, both within and outside of California, what would you estimate was the total amount your firm earned from supply work on Caltrans projects in 2005?

1=$100,000 or less

2=More than $100,000 to $500,000

3=More than $500,000 to $1 million

4=More than $1 million to $2 million

5=More than $2 million to $5 million

6=More than $5 million to $10 million

7=More than $10 million to $20 million

8=More than $20 million to $50 million

9=More than $50 million to $75 million

10=More than $75 million

97=(NONE)

98=(DON'T KNOW)

99=(REFUSED)

D6. [ASK ONLY IF B4=8]Now thinking of all of your firm's locations, both within and outside of California, what would you estimate was the total amount your firm earned from trucking work on Caltrans projects in 2005?

1=$100,000 or less
2=More than $100,000 to $500,000
3=More than $500,000 to $1 million
4=More than $1 million to $2 million
5=More than $2 million to $5 million
6=More than $5 million to $10 million
7=More than $10 million to $20 million
8=More than $20 million to $50 million
9=More than $50 million to $75 million
10=More than $75 million
97=(NONE)
98=(DON'T KNOW)
99=(REFUSED)

E1. My next questions are about the ownership of the business. A business is defined as woman-owned if more than half - that is, 51 percent or more - of the ownership and control is by women. By this definition, is [*firm name / new firm name*] a woman-owned business?

1=Yes
2=No
98=(DON'T KNOW)
99=(REFUSED)

E2. A business is defined as minority-owned if more than half - that is, 51 percent or more - of the ownership and control is African American, Asian, Hispanic, Native American or another minority group. By this definition, is [*firm name / new firm name*] a minority-owned business?

1=Yes
2=No – SKIP TO E4
3=(OTHER GROUP - SPECIFY)
98=(DON'T KNOW)
99=(REFUSED)

E2. OTHER GROUP - SPECIFY

1=VERBATIM

E3. Would you say that the minority group ownership is mostly African American, Asian-Pacific American, Subcontinent Asian American, Hispanic American, or Native American?

1=African-American

2=Asian Pacific American (persons whose origins are from Japan, China, Taiwan, Korea, Burma (Myanmar), Vietnam, Laos, Cambodia(Kampuchea),Thailand, Malaysia, Indonesia, the Philippines, Brunei, Samoa, Guam, the U.S. Trust Territories of the Pacific Islands (Republic of Palau), the Common-wealth of the Northern Marianas Islands, Macao, Fiji, Tonga, Kirbati, Juvalu, Nauru, Federated States of Micronesia, or Hong Kong)

3=Hispanic American (persons of Mexican, Puerto Rican, Cuban, Dominican, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race)

4=Native American (American Indians, Eskimos, Aleuts, or Native Hawaiians)

5=Subcontinent Asian American (persons whose Origins are from India, Pakistan, Bangladesh, Bhutan, the Maldives Islands, Nepal or Sri Lanka)

6=(OTHER - SPECIFY)

98=(DON'T KNOW)

99=(REFUSED)

E3. OTHER - SPECIFY

1=VERBATIM

E4. Is your firm certified as a small business enterprise by the State of California or other agency?

1=Yes

2=No

3=(OTHER - SPECIFY)

98=(DON'T KNOW)

99=(REFUSED)

E4. OTHER - SPECIFY

1=VERBATIM

E5. Is your firm certified as a Disadvantaged Business Enterprise (DBE)?

1=Yes

2=No

3=(OTHER - SPECIFY)

98=(DON'T KNOW)

99=(REFUSED)

E5. OTHER - SPECIFY

1=VERBATIM

F1. Dun & Bradstreet indicates that your company has about [*number*] employees working out of just your location. Is that a fairly accurate average thinking about all of 2005?

(INCLUDES EMPLOYEES WHO WORK AT THAT LOCATION AND THOSE WHO WORK FROM THAT LOCATION)

1=Yes – SKIP TO F3

2=No

98=(DON'T KNOW)

99=(REFUSED) – SKIP TO F3

F2. About how many employees did you have working out of just your location, on average, over the course of last year?

(RECORD NUMBER OF EMPLOYEES)

1=NUMERIC (1-999999999)

F3. Dun & Bradstreet lists the annual gross revenue of your company, just considering your location, to be [*dollar amount*]. Is that accurate for 2005?

1=Yes – SKIP TO F5

2=No

98=(DON'T KNOW)

99=(REFUSED) – SKIP TO F5

F4. Roughly, what was the gross revenue of your company, just considering your location, in 2005? Would you say . . . (READ LIST)

1=Less than $200,000
2=$200,000 - $499,999
3=$500,000 - $999,999
4=$1 Million - $2.49 Million
5=$2.5 Million - $4.9 Million
6=$5 Million - $9.9 Million
7=$10 Million - $24.9 Million
8=$25 Million - $49.9 Million
9=$50 Million or more
98=(DON'T KNOW)
99=(REFUSED)

F5. For 2005, about how many employees did you have, on average, for all of your California locations?

1=(ENTER RESPONSE)
98=(DON'T KNOW)
99=(REFUSED)

F5. RECORD NUMBER OF EMPLOYEES

1=VERBATIM

F6. Roughly, what was the gross revenue of your company, for all of your California locations in 2005? Would you say. (READ LIST)

1=Less than $200,000
2=$200,000 - $499,999
3=$500,000 - $999,999
4=$1 Million - $2.49 Million
5=$2.5 Million - $4.9 Million
6=$5 Million - $9.9 Million
7=$10 Million - $24.9 Million
8=$25 Million - $49.9 Million
9=$50 Million or more
98=(DON'T KNOW)
99=(REFUSED)

G1. Finally, we're giving business owners and managers an opportunity to offer general insights on your industry, including how difficult it is to start or expand your business and to [*bid / propose*] on and win work. As you're thinking, be sure to consider any issues related to Caltrans and local government projects in California. What thoughts do you have to offer on these topics?

1=VERBATIM (PROBE FOR COMPLETE THOUGHTS)

G2. Caltrans is looking for ways to improve its contracting practices and those of its prime [*contractors / consultants*] to ensure that they are open and fair. Do you have any thoughts or suggestions?

1=VERBATIM (PROBE FOR COMPLETE THOUGHTS)

G3. Would you be willing to participate in a follow-up interview about any of these issues?

1=Yes

2=No

98=(DON'T KNOW)

99=(REFUSED)

H1. Just a few last questions. What is your name and position at [*firm name / new firm name*]?

(RECORD FULL NAME)

1=VERBATIM

H2. What is your position?

1=Receptionist

2=Owner

3=Manager

4=CFO

5=CEO

6=Assistant to Owner/CEO

7=Sales manager

8=Office manager

9=(OTHER - SPECIFY)

99=(REFUSED)

H2. OTHER - SPECIFY

1=VERBATIM

H3. For purposes of a receiving any Caltrans materials, is your mailing address [*firm address*]:

1=Yes

2=No

98=(DON'T KNOW)

99=(REFUSED)

H4. What mailing address should Caltrans use to get any materials to you?

1=VERBATIM

H5. What fax number should Caltrans use to get any materials to you?

1=ENTER FAX

97=(NO FAX NUMBER)

98=(DON'T KNOW)

99=(REFUSED)

H5. ENTER FAX NUMBER

1=NUMERIC (1000000000-9999999999)

H6. What e-mail address should Caltrans use to get any materials to you?

1=ENTER E-MAIL

97=(NO EMAIL ADDRESS)

98=(DON'T KNOW)

99=(REFUSED)

H6. (RECORD EMAIL ADDRESS) (VERIFY ADDRESS LETTER BY LETTER: EXAMPLE: 'John@CRI-RESEARCH.COM' SHOULD BE VERIFIED AS: J-O-H-N-at-C-R-I-hyphen-R-E-S-E-A-R-C-H-dot-com)

1=VERBATIM

APPENDIX D.
Procedures for Estimating MBE/WBE Availability

APPENDIX D.
Procedures for Estimating MBE/WBE Availability

This appendix discusses BBC's approach to developing dollar-weighted estimates of relative MBE/WBE availability.

Procedures for Determining MBE/WBE Availability

"Firms," not "business establishments," are the unit of analysis for the availability calculations. BBC applied two types of screening of firms to be counted in the MBE/WBE availability analysis: Fundamental criteria that a firm must meet to be considered in the analysis (regardless of the contract), and criteria that a firm must meet to be considered for a particular contract.

Screening of firms to be considered in the availability analysis for any contract. A firm must meet the following criteria to be counted in the MBE/WBE availability analysis for any contract element.

- Be a for-profit business, not a public agency or not-for-profit organization;
- Have a location in California;
- Be identified by Dun & Bradstreet (D&B) as operating in mid-2006 within a main line of business related to transportation construction and engineering work;
- Have a working phone number and someone who will answer the phone or return a phone call;
- Have an owner or manager who is willing to take part in the availability survey and be able to complete the survey in English;
- Confirm that the firm does perform work related to transportation construction, maintenance or design;
- Confirm that the firm has a main line of business within one of the areas of focus of the availability analysis;
- Have performed or bid on past Caltrans, local government or private sector transportation construction or egineering contracts in the past five years;
- Have been in business during the year in which the contract began; and
- Have answered the survey questions that asked whether the firm was minority- or women-owned and controlled (any firm not answering this question was excluded from the availability analysis).

The study team considered one additional measure to screen firms before considering them available for specific Caltrans contracts or for local agency contracts. Interviewers asked, "Now, thinking about future transportation work, is your company qualified and interested in working with Caltrans and local governments in California?" The only firms considered in the MBE/WBE availability analysis for Caltrans contracts were firms responding "yes" to both or "yes" to just Caltrans work. The only firms considered as available for local agency work were firms responding "yes" to both or "yes" to just local agency work.

Additional screening to be considered for a specific Caltrans or local agency contract or subcontract. MBE/WBE availability for a particular set of contracts is determined contract-by-contract for each element of each contract (the prime portion, subcontract portions, trucking and supply portions, etc.) and then dollar-weighted to determine overall availability.

Firms are counted as available for some prime contracts or subcontracts and not for others depending upon the characteristics of the contract element and the characteristics of the firm, as described below.

For each contract element, the study team's analysis identifies:

- Agency (Caltrans or local agency);
- Location (one of 12 regions based on Caltrans district, or North Region or Central Region for certain engineering contracts);
- Contract role (prime contractor and subcontractor, including supplier and trucker);
- Size of the contract role for subcontractor elements and size of the entire contract for prime contractor elements;
- Date that contract began; and
- Work specialty.

Identify the firms that fit the above characteristics for the contract element:

Agency. A firm must respond that it is qualified and interested in Caltrans work or local agency work to meet the Agency criterion (discussed above).

Location. Firm owners and managers were asked whether or not their firm could be involved in transportation projects within 12 regions of California that correspond to the Caltrans districts. A firm meets the location criterion if it reports that it could be involved in any county within the region in which the work was located. (BBC applied this assumption as 80 percent of the firms surveyed that were counted as available for transportation construction or engineering work reported that they can work in every county of their home region).

Caltrans information for engineering contracts in the North and Central Regions do not identify the district in which the work was conducted. Therefore, any firm available for work anywhere within these regions are assumed to work in any district within the region.

Contract role. To meet the "prime contractor" contract role criterion, the firm must have been awarded or bid on past transportation work as a prime contractor. This can be on Caltrans, local agency or private sector contracts. A firm must have been awarded or submitted bids or quotes as a subcontractor to meet the "subcontractor" test. Similar tests apply for "trucking" and for "supplier."

Size of contract or subcontract element. To be counted as available for subcontract elements, a firm must have been awarded or bid on a past contract or subcontract of similar or greater size to that for the contract element. For prime contract elements, a firm must have been awarded or bid on a past contract or subcontract of similar or greater size to the entire contract amount.

Contract date. To be counted as available for a contract element (both prime contract or subcontract elements), a firm must report an establishment date during or prior to the year in which that prime contract began. Firms that could not recall or did not report an establishment date were presumed to have been founded prior to the study period and therefore were not excluded from the count of available firms because of firm age.

Work specialty. Each work element in a contract is assigned a "work specialty code." This code is based on the main line of work of the firm that actually performed that work element. To be counted as available within a "work specialty," a firm must have the same work specialty code. The code for each firm is based on the description of the main line of business confirmed or identified by the firm owner or manager (the D&B SIC code for the firm or the line of work identified by the firm in Availability Survey). In some cases, the work specialty code was outside the core areas that were studied in the Availability Survey. These specialty areas were coded as other construction, other construction supply, other construction equipment and other professional services. Firms in these "other" specialty areas that were surveyed in the availability analysis are used as a proxy for these "other" firms when determining relative MBE/WBE availability for these contract elements.

In some cases, the work specialty code could not be identified beyond general construction or engineering work. Availability for those work elements was based on all firms that do prime or subcontracting work (for construction versus engineering contracts). The firms counted as available for that contract element were also subject to other screening (location, etc.).

Dollar-Weighting Across Contracts

The process described above relates to determining relative MBE/WBE availability for a specific contract element. To develop an availability figure pertaining to many different contracts, BBC weighted the MBE/WBE availability for a contract element by the dollars awarded or paid for that contract element. Large subcontracts received a greater weight than smaller subcontracts, for example.

The Availability and Disparity Study examines transportation construction and engineering contracts awarded by Caltrans directly and by local governments receiving federal or state funds through Caltrans. These contracts involve both prime contractors and subcontractors ("prime consultants" and "subconsultants" for transportation engineering contracts). The balance of this appendix reviews the data Caltrans currently collects and maintains for these contracts and the additional data collection the study team undertook to complete the MBE/WBE availability analysis.

Collection of Contract Information

The study team collected contract information for Caltrans construction and engineering contracts; Local Assistant contracts (both design and construction phases); and the State Route 125 project.

Construction contracts. BBC collected Caltrans construction contract information for the period of January 1, 2002 through December 31, 2006 or late-2006 from the following sources:

- Bid summary database;
- Request to Sublet forms (Form 1201);
- Substitution of subcontractor information (also on Form 1201); and
- Final report of utilization (Form 2402F).

After extensive review of these data sources, the study team determined that the Request to Sublet (1201) forms provided the most reliable and comprehensive information.

The Request to Sublet form lists the prime contractor and all the subcontractors they plan to use that will receive payments in excess of one-half of one percent of the total contract amount. The prime contractor also lists dollar amount estimates for each subcontractor. Caltrans uses this form to make sure that primes perform at least 50 percent of the work, a requirement in state law. (Certain specialty subcontracting is not counted against the subcontracting limit but still reported on this form.) Because all subcontractors need to be listed regardless of DBE status, this form is suitable for identifying the size of each subcontract at time of award.

Caltrans does not maintain a database for Request to Sublet information. Although some information is present at Caltrans Headquarters, the requests to sublet generally are kept in hard copy form in the contract files for each construction contract. These files are typically found in each Caltrans district. Certain districts that serve as regional headquarters sometimes consolidate information from other districts in their region.

The BBC study team went to Caltrans district offices to attempt to locate 1201 Forms for each Caltrans construction contract from January 1, 2002 through December 31, 2006. Once the form for a contract was located, the study team made photocopies of the forms. The study team used the Bid Summary database on Caltrans construction contracts as a master list of contracts to aid in locating the appropriate construction contract file and 1201 Form. When a construction contract file was not immediately available from district files, Caltrans staff assisted in locating the files. Once a construction file was located, nearly every file contained a 1201 Form. Following the collection of forms from all districts, the study team entered information directly from these forms into an electronic database that recorded contract number, funding source, and location of work, as well as each prime and subcontracting firm's name, address, DBE status, and contract-specific payment amounts.

According to state law, any prime contractor wishing to substitute a subcontractor or make substantial changes to the work to be performed by a subcontractor must obtain approval from Caltrans prior to making this change. (Prior to May 1, 2006, Caltrans' DBE program had similar requirements when substituting a DBE.) The prime contractor must submit a separate 1201 Form for the substituting subcontracting firm in order to comply with this requirement. The study team collected 1201 Forms pertaining to substitution of subcontractors at the same time and in the same fashion as described above.

Transportation engineering contract data collection. The study team sought information on prime consultants and subconsultants performing engineering-related services for Caltrans from 2002 through 2006. The Caltrans Division of Procurement and Contracts (DPAC) maintains data on prime consultants receiving Caltrans contracts through this time period, but does not have complete information on subconsultants. Therefore, the DPAC data could only serve as a master list of engineering-related contracts for the study period.

Caltrans does not document information for DBE and non-DBE engineering subconsultants within any single form comparable to the 1201 Form that is completed for construction contracts. Individual districts do maintain information on prime consultants and subconsultants through consultant invoices sent to the district contract administrator. Because the source data come from

invoices, the information pertains to prime consultants and both DBE and non-DBE subconsultants. Some districts enter this information into electronic databases. Because of the magnitude of this data collection effort, the study team collected district databases where available and developed a sampling strategy for districts that did not maintain electronic data.

Sampling methodology. The North Region (Districts 1, 2 and 3), District 4, District 11 and District 12 did not maintain or were unable to provide electronic files to document firm-specific payments for engineering contracts within the study period.

The study team sampled engineering contracts in these districts. For each district, the study team defined the sample frame to be all design consultant contracts listed in the DPAC database that were executed on or after January 1, 2002 and that were related to engineering contracts (including environmental consulting, landscape design, traffic studies, etc.).

After defining the sample frame, the study team selected the following engineering-related contracts for data collection:

- All contracts that did not receive federal funds;
- All federally-funded contracts executed after the May 1, 2006 transition to an all race-neutral DBE program;
- One out of every three remaining federally-funded contracts, selected sequentially based on contract number.

This generated a sample of 42 out of 88 total engineering contracts in the North Region and in Districts 4, 11, and 12. The study team worked with staff in each district to locate the contract information. The team successfully captured contract information for 34 of the 42 sampled contracts.

Data collection. Within those six districts that did not have or had not made available electronic files to track firm-specific payments for contracts during the study period, the study team collected prime and subconsultant payment information from task order invoices for each sampled contract. The study team conducted this data collection at district offices during fall 2006. This data collection project involved the entry of information about firms and payment amounts from every task order invoice submitted under a selected contract into a spreadsheet similar to the database developed by Central Region consultant services contract management staff.

District databases. Several districts (Central Region, District 7, District 8) possess spreadsheets or databases that track the firm-specific payment information contained on the task order invoices. The methods and the format of these spreadsheets vary slightly across these districts, but BBC determined that the data of interest to the utilization analysis were available for nearly all contracts from these districts. Data collection for those six districts with reliable and nearly exhaustive records of firm-specific spending also included follow-up requests from the study for similar electronic files for the remaining contracts for 2006.

Identification of location. Due to the centralized administration of consultant service contracts in the North and Central Regions for districts within those regions, it was not possible to determine the exact districts in which the region's contracted work was completed. As a result, the study team was unable to report district-specific engineering utilization for Districts 1, 2, 3, 5, 6, 9, or 10. Instead, the study team examined and reported utilization at the regional level.

Local Assistance contract data collection. Certain federal funds help reimburse costs of construction and engineering contracts directly awarded by Caltrans. Other federal funds administered by Caltrans go to local government transportation projects. Cities, counties and other local agencies award construction and engineering work to be reimbursed by Caltrans using federal and state monies. Where federal funds are used, the Federal DBE Program requires subrecipients to comply with the state department of transportation program approved by USDOT.

Caltrans does not currently maintain comprehensive information on the types of construction and engineering work involved in the federally-assisted contracts awarded by local agencies. In addition, firms available for these contracts may not be known to Caltrans, as local agencies perform the contracting functions.

Sampling methodology. Using an electronic database of Caltrans grants to local agencies for transportation design and construction work from 2002 to the present, the study team, working with staff in the Caltrans Division of Local Assistance, defined a sample of local agency projects for data collection. This database listed an agency and project identifier, the project-specific phases supported through the grant (design, construction, or right of way), and the source of the funds (federal or state) for all grants. For some of the grants, this database also listed the dollar amount, project date, date of award, and a location and work type description for a subset of the grants.

Using this information, the BBC study team excluded grants to projects with start dates prior to the study period and those that did not specify financial support for a construction or design phase. The study team retained grants to projects without project dates in the sample to avoid excluding valid cases. Next, the study team split the projects into two sample frames determined by funding source (state or federal) and sorted these two lists by the total amount of the project-specific grants. The study team eliminated projects with negative grant amounts on the advice of Local Assistance staff that these negative amounts likely reflected transfers of funds from previous grants back to the division.

Having defined separate sample frames for federally-assisted and state-administered project grants, the study team assigned each project grant to one of eight strata and sampled projects from within these groups. Federally-assisted grants to projects with dates after May 1, 2006 were assigned to a separate stratum. The remaining federally-assisted grants, including those to projects without a recorded project start date, were split into four strata based on the dollar amount of the grant: less than $1 million, $1 million to $2 million, $2 million to $5 million, and more than $5 million. State-administered grants to local agencies comprise the remaining three strata, again assigned according to dollar amount of the grant: less than $1 million, $1 million to $2 million, and more than $2 million.

In order to maximize the sample's total share of Caltrans federal and state grant dollars going to local agencies, the BBC study team sampled a large proportion of those projects in the larger grant strata and smaller shares of those projects in the smaller grant strata. Figure D-1 enumerates the number of project phases in each strata and the number of these that were included in the sample.

Figure D-1.
Sampling and sample weights for local assistance projects

	State-funded contracts	Federally-assisted contracts	
	2002-2006	Before May 1, 2006	After May 1, 2006
More than $5 million	Sampled every project: 171 Received completed information for: 78 Sample weight: 2.19	Sampled all projects: 153 Received completed information for: 107 Sample weight: 1.43	Sampled every project: 36 Received completed information for: 25 Sample weight: 1.44
$2 to $5 million		Sampled: 44 of 195 Received completed information for: 32 Sample weight: 6.09	
$1 to $2 million	Sampled: 74 of 110 Received completed information for: 34 Sample weight: 3.23	Sampled: 41 of 303 Received completed information for: 27 Sample weight: 11.22	
Less than $1 million	Sampled: 112 of 1,439 Received completed information for: 66 Sample weight: 21.8	Sampled: 62 of 2,479 Received completed information for: 44 Sample weight: 56.34	

Source: BBC Research and Consulting.

Data collection. Having defined the sample of grants and project phases for data collection, the BBC study team and Caltrans Local Assistance staff developed a letter of introduction and an individualized data request form for submission to every agency included in the sample.

With follow-up and assistance from District Local Assistance Engineers, the BBC study team received valid information for 413 of the 693 project phases included in the original sample. The number of complete responses from each stratum is reported in Figure D-1. Because of the sampling design (obtaining a relatively large sample of the largest Local Assistance contracts), the information received from local agencies represented an estimated 42 percent of the total dollars of Local Assistance projects during this time frame.

The compiled information indicated if the local agency contracted out construction and design services, and if so, the anticipated or actual payment amounts to all prime contractors and subcontractors involved in these project phases. The study team manually entered this information from the request forms into a separate Local Assistance database.

State Route 125 project data collection. The State Route 125 South (SR 125) project in southern San Diego County is an 11-mile corridor of new four-lane controlled-access highway/toll road between State Route 905 (SR 905) and State Route 54 (SR 54). The total budget for all phases of the project is $644 million, which is funded through various private and public resources.

The project is being designed and constructed under a franchise agreement between Caltrans and South Bay Expressway (SBX), formerly California Transportation Ventures (CTV). The latter entity

is a private consortium selected by Caltrans in 1990 to develop the project with Caltrans providing oversight. Otay River Constructors (ORC) is the prime contractor design-builder.

During the study period, ORC began the two primary construction sub-projects of the SR 125 project. The "Gap Connector" sub-project includes the northern 1.5 miles of the toll road and the freeway-to-freeway interchange at SR 54 and is publicly funded with a combination of federal monies and local sales tax funds. The remaining 9 miles of construction comprise the "Toll Road" sub-project and are funded by a mix of private financing and a direct federal loan through the U.S. Department of Transportation's TIFIA program in TEA-21. Staff at SBX informed BBC that contracts for these sub-projects were completed during the spring of 2003.

Given the use of federal dollars in support of this project, the Federal DBE Program was in place for these sub-projects. Caltrans District 11 staff monitor and report compliance of the DBE Program on the "Gap Connector" and the "Toll Road" sub-projects.

Caltrans District 11 staff issued data requests on behalf of BBC and received several items in response from ORC and SBX. ORC submitted a hard-copy spreadsheet that detailed payment information for both the "Gap Connector" and "Toll Road" construction elements. This spreadsheet listed each subcontracting firm that had received work and sub-project-specific dollar amounts paid or anticipated. SBX provided electronic copies of the invoice payment requests from Otay River Constructors, which indicated sub-project-specific amounts paid through December 2006.

The study team entered firm names, addresses, and sub-project-specific payment amounts from these hard-copy spreadsheets and invoices into a separate SR 125 database. The study team calculated firm-specific payment amounts for the entire SR 125 project and analyzed these as payments under one large contract.

APPENDIX E.
Analysis of U.S. Census of Population Data

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Analysis of U.S. Census of Population Data

The study team utilized U.S. Census data from the 1980, 1990 and 2000 U.S. Census 5% Public Use Micro-samples (PUMS data) to analyze:

- Demographic characteristics of workers in construction and engineering, including related occupations;
- Educational attainment; and
- Self-employment (business ownership).

PUMS offers several features ideal to the analyses reported in this study, including historical cross-sectional data; stratified national and state-level samples; large sample sizes, even for subsets of the population (e.g., ethnic and occupational groups); and robust variables for statistically significant estimates.

BBC obtained selected Census data via the Minnesota Population Center's Integrated Public Use Micro-data Series (IPUMS). The IPUMS program provides access to customized, accurate data extracts. These data are available at the IPUMS web site.[1]

Data for 2000

The 2000 U.S. sample contains 14,081,466 observations. Applying the Census person-level population weights, this sample represents 281,421,906 people in the United States. The 2000 California sub-sample contains 1,690,642 individual observations, weighted to represent 33,884,660 people in the state.

Categorizing individual race/ethnicity. To define race/ethnicity for the 2000 Census data set, BBC used the IPUMS race variable with the greatest level of detail and categorized each race type into one of seven groups:

- Non-Hispanic white;
- Hispanic American;
- African-American;
- Asian-Pacific American;
- Subcontinent Asian American;
- Native American; and
- Other minority (unspecified)

[1] Steven Ruggles, Matthew Sobek, Trent Alexander, Catherine A. Fitch, Ronald Goeken, Patricia Kelly Hall, Miriam King, and Chad Ronnander. *Integrated Public Use Microdata Series: Version 3.0* [Machine-readable database]. Minneapolis, MN: Minnesota Population Center [producer and distributor], 2004. http://usa.ipums.org/usa/

An individual is considered "non-Hispanic white" if not Hispanic and not in combination with any other race group. Any self-identified Hispanic individuals are considered Hispanic American, regardless of any other race group identification.

For the five other race groups, an individual's race/ethnicity is categorized by the first (or only) race group identified in each possible race-type combination. BBC uses a rank ordering methodology which complements the 2000 Census data dictionary rank ordering. African-American is first, followed by Native American, then Asian-Pacific American and finally Subcontinent Asian American. For example, if an individual identified "Korean," this person belongs in the Asian-Pacific American category, whereas, if the individual identified "Korean" in combination with "Black," the individual is considered African-American. Hispanic identification overrules any other race group identification.

- The Asian-Pacific American category includes the following race/ethnic groups: Cambodian, Chamorro, Chinese, Filipino, Guamanian, Hmong, Indonesian, Japanese, Korean, Laotian, Malaysian, Samoan, Taiwanese, Thai, Tongan, and Vietnamese. This category also includes other Polynesian, Melanesian and Micronesian races as well as individuals identified as Pacific Islanders.

- The Subcontinent Asian American category includes these race groups: Asian Indian (Hindu), Bangladeshi, Pakistani, and Sri Lankan. Any individuals identified as "Asian," but not clearly categorized as Asian-Pacific versus Subcontinent Asian, are put into the Asian-Pacific group. (Overall, nine in ten Asians counted in the 2000 Census in California were Asian-Pacific Americans.)

- American Indian, Alaskan Native, Hawaiian and Latin American Indian groups are considered Native American.

- If an individual is identified with any of the above groups and an "other race" group, the individual is categorized into the known category. Individuals identified as "Other race" or "White and other race" are categorized as "Other minority."

The exception to the rules listed above applies to individuals who are Asian-Pacific American in combination with Hawaiian. An individual identified as Hawaiian alone is considered Native American. Individuals who are a combination of Native American and Asian-Pacific are considered Native American in all cases except those identified as Hawaiian Native Americans. These individuals are considered primarily Asian-Pacific.

Business ownership. BBC uses the Census "class of worker" variable (CLASSWKD) to determine self-employment. Individuals are classified into eight categories:

- Self-employed for a non-incorporated business,

- Self-employed for an incorporated business,

- Wage or salary employee for a private firm,

- Wage or salary employee for a non-profit organization,

- Employee of the Federal government,

- Employee of a State government,

- Employee of a local government, or
- Unpaid family worker.

BBC included as business owners individuals who reported self-employment, either for an incorporated or a non-incorporated business.

Defining selected industry sectors. The construction sector is defined using the 2000 Census code for the industry, 077, which is equivalent to the 1997 NAICS code 23. The Architectural, Engineering and Related Services industry is Census code 729, corresponding to 1997 NAICS code 5413.

Relevant engineering occupational titles. When referring to engineering as an occupation, BBC included civil (136), environmental (142), mining and geological engineers (150). The Census codes for these occupational titles (in parentheses) tie to Standard Occupational Classification (SOC) codes 17-2051, 17-2081 and 17-2151, respectively.

Education variables. BBC used the variable denoting the highest level of educational attainment to classify individuals into the following four categories: less than high school, high school diploma, some college and at least a bachelor's degree.

Definition of workers. The universe for the class of worker, industry and occupation variables includes individuals over the age of 16 who reported last working within the five years preceding the Census survey.

Comparisons Over Time

BBC utilized IPUMS data from the 1980, 1990 and 2000 Censuses to analyze changes in worker demographics, educational attainment and business ownership over time.

Changes in race/ethnicity categories between censuses. Figure E-1 lists the seven BBC-defined race/ethnic categories with the corresponding 2000, 1990 and 1980 Census race groups. The comparability of specific race/ethnic categories is relatively straightforward between 1980 and 1990. However, the U.S. Bureau of the Census introduced a combination of race types in 2000. Individuals could select multiple races when responding to the 2000 Census questionnaire.

For example, an individual who is primarily white, yet with one quarter of Native American ancestry, could choose the "White and American Indian/Alaska Native" race group in 2000. However, if the same individual must choose a single race, as in prior years, the choice may either be "white" or "American Indian/Alaska Native." The choice depends on unknowable factors including how strongly the individual identifies with his or her Native heritage. In addition, the data analyst does not have information about the proportions of individual ancestry, and will only know that the ancestry is mixed. The variability introduced by allowing multiple race selection complicates direct comparisons between race data from the 2000 Census and previous censuses. Even so, 98 percent of survey respondents in 2000 indicated a single race.[2]

[2] Grieco, Elizabeth M. & Rachel C. Cassidy. "Overview of Race and Hispanic Origin," *Census 2000 Brief*, March 2001, page 3.

Figure E-1.
BBC race/ethnic categories compared with
Census race and Hispanic Origin survey questions, 1980-2000

BBC-defined race/ethnic categories	2000 Census	1990 Census	1980 Census
African-American	**Hispanic origin:** no **Race:** Black/Negro alone or in combination with any other non-Hispanic group	**Hispanic origin:** no **Race:** Black/Negro	**Hispanic origin:** no **Race:** Black/Negro
Asian-Pacific American	**Hispanic origin:** no **Race:** Chinese, Taiwanese, Japanese, Filipino, Korean, Vietnamese, Cambodian, Hmong, Laotian, Thai, Indonesian, Malaysian, Samoan, Tongan, Polynesian, Guamanian/Chamorro, Pacific Islander, Micronesian, Melanesian, or other Asian, either alone or in combination with any non-Hispanic, non-Black, or non-Native American groups. *Does include Asian-Pacific in combination with Hawaiian.*	**Hispanic origin:** no **Race:** Chinese, Taiwanese, Japanese, Filipino, Korean, Vietnamese, Cambodian, Hmong, Laotian, Thai, Burmese, Indonesian, Malaysian, Okinawan, Samoan, Tahitian, Tongan, Guamanian/Chamorro, Northern Mariana Islander, Palauan, Fijian, Pacific Islander, Micronesian, Melanesian, other Polynesian, or other Asian	**Hispanic origin:** no **Race:** Chinese, Japanese, Filipino, Korean, Vietnamese, Pacific Islander or other Asian
Subcontinent Asian American	**Hispanic origin:** no **Race:** Asian Indian, Bangladeshi, Pakistani or Sri Lankan, alone or in combination with white or other groups only	**Hispanic origin:** no **Race:** Asian Indian, Bangladeshi, Pakistani or Sri Lankan	**Hispanic origin:** no **Race:** Asian Indian
Hispanic American	**Hispanic origin:** yes **Race:** any race groups, alone or in combination with other groups	**Hispanic origin:** yes **Race:** any	**Hispanic origin:** yes **Race:** any, - OR - **Hispanic origin: no** **Race:** Spanish
Native American	**Hispanic origin:** no **Race:** American Indian or Alaskan Native tribe identified, or Hawaiian, alone or in combination with any non-Hispanic, non-Black group. *Does not include Asian-Pacific in combination with Hawaiian.*	**Hispanic origin:** no **Race:** American Indian or Alaskan Native tribe identified, or Hawaiian	**Hispanic origin:** no **Race:** American Indian/Alaska Native or Hawaiian
Other minority group	**Hispanic origin:** no **Race:** other race alone or in combination with white only	**Hispanic origin:** no **Race:** other race	**Hispanic origin:** no **Race:** other race
Non-Hispanic white	**Hispanic origin:** no **Race:** white alone	**Hispanic origin:** no **Race:** white	**Hispanic origin:** no **Race:** white

Source: BBC Research and Consulting from the IPUMS program: http://usa.ipums.org/usa/.

Although there are fewer race types in the 1980 data, the 1990 race types fall into 1980 categories. However, by using two categories of Asian individuals, BBC loses some accuracy when comparing Asian individuals between 1980 and 1990: individuals identified as Bangladeshi, Pakistani and Sri Lankan are categorized as "Subcontinent Asian American" in 1990, yet these race groups are not included in 1980. In 1980, the same individuals would be included in the "Other Asian" race type, and therefore categorized by BBC as "Asian-Pacific American." Together, these three groups accounted for 0.04 percent of the 1990 sample.

Business ownership. BBC uses the Census "class of worker" variable (CLASSWKD) to determine self-employment. This variable is the same for 1980, 1990 and 2000.

Changes in industry codes between censuses. The Construction sector is coded as "077" in the 2000 Census, and "060" in the 1990 and 1980 Censuses. The 2000 Census includes the "Architectural, Engineering and Related Services" industry as code "729." In 1980 and 1990, the code is "882" for "Engineering, Architectural and Surveying Services."

Changes in occupational codes between censuses. Occupational titles and codes vary between censuses. BBC makes the following adjustments:

- **Codes used to determine the occupational (versus industry) category of engineer.** The 1980 and 1990 Censuses do not include specific categories for environmental or geological engineers, so these are omitted when comparing populations over time by engineering occupation. Instead, BBC focuses on civil engineers, coded as "136" in 2000, or "53" in 1980 and 1990.
- **Codes used to determine occupations within the construction industry.** Figure E-2 contains the occupational code crosswalk and all job descriptions.

Changes in educational variables between censuses. The 1990 and 2000 Censuses provide the same educational attainment variables, which denote the highest degree achieved, but the 1980 Census uses a highest-grade completed variable. In order to compare educational attainment from 1980 to 1990 or 2000, BBC made the following assumptions:

- An individual has less than a high school diploma the individual is attending 12th grade or at any lower grade level.
- An individual who completed 12th grade is considered a high school graduate.
- An individual who completed at least 12th grade, but less than completion of four years of college is categorized under "some college."
- An individual who completed at least four years of college is categorized as receiving at least a bachelor's degree.

Figure E-2.
Occupational crosswalk for 1980 and 2000 IPUMS data

Census 2000 Occupational title and code	Census 1980 Occupational title and code	Job description for 2000 titles
Construction laborers 626	Construction laborers 869	Perform tasks involving physical labor at building, highway, and heavy construction projects, tunnel and shaft excavations, and demolition sites. May operate hand and power tools of all types: air hammers, earth tampers, cement mixers, small mechanical hoists, surveying and measuring equipment, and a variety of other equipment and instruments. May clean and prepare sites, dig trenches, set braces to support the sides of excavations, erect scaffolding, clean up rubble and debris, and remove asbestos, lead, and other hazardous waste materials. May assist other craft workers. Exclude construction laborers who primarily assist a particular craft worker, and classify them under "Helpers, Construction Trades."
Cement masons, concrete finishers and terrazzo workers 625	Concrete and terrazzo finishers 588	Smooth and finish surfaces of poured concrete, such as floors, walks, sidewalks, or curbs using a variety of hand and power tools. Align forms for sidewalks, curbs or gutters; patch voids; use saws to cut expansion joints. Terrazzo workers apply a mixture of cement, sand, pigment or marble chips to floors, stairways, and cabinet fixtures.
Iron and steel workers, including reinforcing iron and rebar workers 653	Structural metal workers 597	*Iron and steel workers* raise, place, and unite iron or steel girders, columns, and other structural members to form completed structures or structural frameworks. May erect metal storage tanks and assemble prefabricated metal buildings. *Reinforcing iron and rebar workers* position and secure steel bars or mesh in concrete forms in order to reinforce concrete. Use a variety of fasteners, rod-bending machines, blowtorches, and hand tools. Include rod busters.
Electricians 635	Electricians and apprentices 575 & 576	Install, maintain, and repair electrical wiring, equipment, and fixtures. Ensure that work is in accordance with relevant codes. May install or service street lights, intercom systems, or electrical control systems. Exclude "Security and Fire Alarm Systems Installers." The 2000 category includes electrician apprentices.
Paving, surfacing and tamping equipment operators 630	Paving, surfacing and tamping equipment operators 594	Operate equipment used for applying concrete, asphalt, or other materials to road beds, parking lots, or airport runways and taxiways, or equipment used for tamping gravel, dirt, or other materials. Include concrete and asphalt paving machine operators, form tampers, tamping machine operators, and stone spreader operators.
Miscellaneous construction equipment operators, including pile-driver operators 632	Grader, dozer and scraper operators 855	Operate one or several types of power construction equipment, such as motor graders, bulldozers, scrapers, compressors, pumps, derricks, shovels, tractors, or front-end loaders to excavate, move, and grade earth, erect structures, or pour concrete or other hard surface pavement. Operate pile drivers mounted on skids, barges, crawler treads, or locomotive cranes to drive pilings for retaining walls, bulkheads, and foundations of structures, such as buildings, bridges, and piers.

Figure E-2. (continued)
Occupational crosswalk for 1980 and 2000 IPUMS data

Census 2000 Occupational title and code	Census 1980 Occupational title and code	Job description for 2000 titles
Driver/sales workers and truck drivers 913	Truck drivers (heavy), truck drivers (light) and driver-sales workers 804, 805 & 806	*Driver/sales workers* drive trucks or other vehicles over established routes or within an established territory and sell goods, such as food products, including restaurant take-out items, or pick up and deliver items, such as laundry. May also take orders and collect payments. Include newspaper delivery drivers. *Truck drivers (heavy)* drive a tractor-trailer combination or a truck with a capacity of at least 26,000 GVW, to transport and deliver goods, livestock, or materials in liquid, loose, or packaged form. May be required to unload truck. May require use of automated routing equipment. Requires commercial drivers' license. *Truck drivers (light)* drive a truck or van with a capacity of under 26,000 GVW, primarily to deliver or pick up merchandise or to deliver packages within a specified area. May require use of automatic routing or location software. May load and unload truck. Exclude "Couriers and Messengers."
Crane and tower operators 951	Crane and tower operators 849	Operate mechanical boom and cable or tower and cable equipment to lift and move materials, machines, or products in many directions. Exclude "Excavating and Loading Machine and Dragline Operators."
Dredge, excavating and loading machine operators 952	Excavating and loading machine operators 853	*Dredge operators* operate dredge to remove sand, gravel, or other materials from lakes, rivers, or streams; and to excavate and maintain navigable channels in waterways. *Excavating and loading machine, and dragline operators* Operate or tend machinery equipped with scoops, shovels, or buckets, to excavate and load loose materials. *Loading machine operators, underground mining*, Operate underground loading machine to load coal, ore, or rock into shuttle or mine car or onto conveyors. Loading equipment may include power shovels, hoisting engines equipped with cable-drawn scraper or scoop, or machines equipped with gathering arms and conveyor.
First-line supervisors/managers of construction trades and extraction workers 620	Supervisors (categories separated): brickmasons, stonemasons, and tile setters; carpenters and related workers; electricians and power transmission installers; painters, paperhangers and plasterers; plumbers, pipefitters and steamfitters; n.e.c.; and extractive occupations 553-558 & 613	Directly supervise and coordinate the activities of construction or extraction workers.

Figure E-2. (continued)
Occupational crosswalk for 1980 and 2000 IPUMS data

Census 2000 Occupational title and code	Census 1980 Occupational title and code	Job description for 2000 titles
Construction managers 22	Managers and administrators, n.e.c 19	Plan, direct, coordinate, or budget, usually through subordinate supervisory personnel, activities concerned with the construction and maintenance of structures, facilities, and systems. Participate in the conceptual development of a construction project and oversee its organization, scheduling, and implementation. Include specialized construction fields, such as carpentry or plumbing. Include general superintendents, project managers, and constructors who manage, coordinate, and supervise the construction process.

Note: All occupational groups include only individuals who work in the construction industry. By definition, this includes workers over the age of 16 who reported last working within five years of the Census survey.

Source: 2000 Census occupational titles and codes at http://usa.ipums.org/usa/volii/00occup.shtml, 1980 codes and titles at http://usa.ipums.org/usa/volii/98occup.shtml, job descriptions from the Bureau of Labor Statistics www.bls.gov.